American Artisan

Founded 1880

The Warm Air Heating and Sheet Metal Journal

Vol. 96, No. 3 CHICAGO, JULY 21, 1928 $2.00 Per Year

Heating Merchants Who are Genuinely interested in Increasing Profits . . . . Will find the Opportunity *in the Sunbeam 4 Point Selling Plan*

Remember how Mahomet went to the mountain when the mountain would not come to him? Heretofore, the same situation has obtained in the furnace industry. You could not take the furnace to the prospect. You took the prospect to the furnace—when you could persuade him to make the trip. . . . But that was before the Sunbeam Miniature Aluminum Furnace was available.

At the left is shown the Sunbeam Miniature Aluminum Furnace and the special case in which it fits. This Miniature is a replica of the new 1000 Series Sunbeam with one piece radiator; feed section and ash pit extending outside of the front of the furnace. It is made from real patterns to a scale of 3 inches to the foot.

Take the Mountain to Mahomet

When you have a better furnace to sell—a furnace replete with advantages and talking points such as the New Sunbeam Warm-Air Furnaces, 1000 Series—you are handicapped unless your prospects have an opportunity to inspect and examine the product. You lose many possible sales because they fail to appreciate all its numerous superiorities, which an examination would reveal.

But you need not lose any sales of Sunbeam Warm-Air Furnaces, 1000 Series, because of this difficulty. You can bring the furnace right into the prospect's living room. Show him the massive one piece radiator, cleanout and smoke collar cast in one piece; the absence of vertical joints within warm-air chamber; the large combustion chamber and heavy fire pots; the hot blast, vapor pan, upright shaking handle and the score of other construction features.

You can do it with the Miniature Aluminum Furnace which shows Sunbeam design in every detail.

This Miniature Furnace is 12 inches in height and is furnished to Sunbeam Dealers in a special Fabrikoid covered case, attractively lined in purple velveteen to set off the Miniature when the case is open. A complete retail selling outfit, literature, order blanks, portfolio and a small register can also be accommodated in the case.

Let us tell you how you can obtain one.

This Miniature Furnace; Sunbeam deferred payments with as long as 2 years to pay; the complete assortment of advertising literature—plus the new advanced Sunbeam Warm-Air Furnaces, 1000 Series, give Sunbeam Dealers a decided advantage. Return the coupon for complete details.

THE FOX FURNACE COMPANY, ELYRIA, OHIO

Largest Makers of Heating Equipment in the World

SUNBEAM
WARM-AIR HEATING

The Fox Furnace Co.,
Elyria, Ohio.

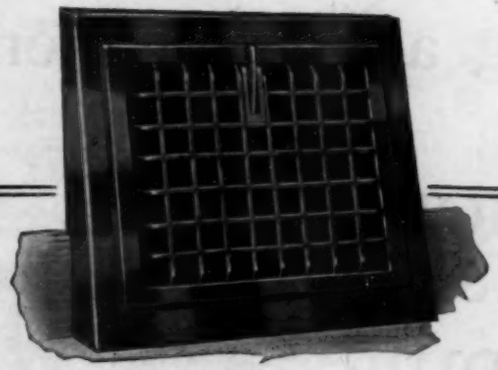
Please send us complete information about the new Sunbeam 4 Point Selling Plan. Also send a copy of the 40-page Catalog and Heating Manual.

Name .....

Address .....

City and State A-8

Published Weekly by American Artisan and Hardware Record, Inc., 620 South Michigan Avenue, Chicago, Illinois. AMERICAN ARTISAN—the Warm Air Heating and Sheet Metal Journal—entered as second class matter, March 26, 1928, at the Post Office at Chicago, Illinois, under act of March 3, 1879. Formerly entered on June 25, 1887, as American Artisan and Hardware Record.



The AUERISTOCRAT

of all registers, combining air capacity, decorative and concealing features.

Designed to conform with the Standard Code so they fit all standard boxes.

Auer Patented mechanical features make it perfect in operation,—quick and easy to install.

Auer's Save Hours and Dollars

The AUER REGISTER CO.
Cleveland, Ohio

All Standard Finishes

STEARNS *Registers*

YOU'LL want these better registers in order to secure a better profit.

Your customers will want them because they meet the demand for attractiveness and practical service

100 PER CENT FREE AIR CAPACITY FOR SIZE PIPE INTENDED

Supplied in all standard finishes of course—write for our catalog which gives full details.

The highest grade economically priced register.

Your Jobber Can Supply You

THE STEARNS REGISTER CO.
1234 Mt. Elliott Ave. Detroit, Michigan

Photograph courtesy of Doe & Little Coal Company, Providence, R. I.

Earn $25.00 a Day!

$25.00 profit on cleaning jobs alone—every day until next fall when fires are started up. That's what heating engineers can earn by cleaning heating plants with the Sturtevant Furnace and Boiler Cleaner—the quickest, lightest and most thorough cleaning device on the market.

Five heaters can be cleaned easily in a day. $8.00 a job less $3.00 to cover cleaning and transportation gives you $5.00 profit or $25.00 a day. But your profit does not stop there. You can increase your sales considerably on repairs and repair parts. Nearly every heater you clean will need repairs of some kind.

This business is well worth going after. It's right in your locality. If you don't go after it your competitor may. Personal solicitation or a postal card sent to your old customers and their friends, announcing that you now clean all kinds of heaters by vacuum—the dustless, quick way—should bring enough business to keep you busy for the next three or four months.

Get complete information and price on the Sturtevant Furnace and Boiler Cleaner. Mail the coupon below—NOW!

B. F. STURTEVANT COMPANY
HYDE PARK, BOSTON, MASS.

Plants at: Berkeley, Cal. Camden, N. J. Framingham, Mass.
Galt, Ontario Hyde Park, Mass. Sturtevant, Wisc.

Offices in Principal Cities

Sturtevant
(REG. U. S. PAT. OFF.)

AA-7-21

B. F. Sturtevant Company,
Hyde Park, Boston, Mass.

Without obligation to me, send along further information and price on the Sturtevant Portable Furnace Cleaner.

Name .....

Address .....

City ..... State.....

Founded 1880

Published to Promote Better Warm Air Heating and Sheet Metal Work

American Artisan

The Warm Air Heating and Sheet Metal Journal

Yearly Subscription Price:
United States.....$2.00
Canada $3.00
Foreign $4.00

Published EVERY SATURDAY at 620 South Michigan Avenue, Chicago

ADVERTISING AND EDITORIAL STAFF

Etta Cohn — Franklin Butler — G. J. Duerr
J. F. Johnson — Chas. E. Kennedy — Frank McElwain

Eastern Representatives: M. M. Dwinell, J. S. Lovingham, 156 Fifth Avenue, New York City

Vol. 96, No. 3 — CHICAGO, JULY 21, 1928 — $2.00 Per Year

Table of Contents

AN OPPORTUNITY

At the recent conventions of the National Association of Sheet Metal Contractors and of the National Warm Air Heating Association some very fine programs for carrying on the activities for betterment of the industries were promulgated. But it is not sufficient to expect committees to do all of the work. Every sheet metal contractor and warm air heating man should take it upon himself to offer his ideas and suggestions as to how best to work out these programs. AMERICAN ARTISAN *gives you an opportunity to have your views aired. Let us have them. In this way they will come to the attention of the committee chairmen.*

A Combined Service for The Sheet Metal Shop

Concentrate Purchases through this One Source and Save Time and Money

SPECIAL heated storerooms protect the quality and finish of the hundreds of tons of sheets carried at Ryerson plants, ready for Immediate Shipment to the sheet metal shops. Whether you need a bundle or a ton, plain galvanized or special rust resisting sheets, your order will have our personal attention and will be delivered at once.

In addition, bars, angles, channels, rivets, bolts, etc., are furnished from the general steel departments. Beaders, turning machines, snips and all the many sheet metal tools are supplied by our Small Tools and Machinery Division. Combined shipments often save considerable time and money.

Use this combined service--let Ryerson carry your stocks, subject to immediate delivery.

Partial List of Sheets Carried in Stock

Ascoloy
Allegheny Metal
Black Steel
Blue Annealed
Galvanized

Silver Finish
"C" Pickled
Single Pickled
Deep Stamping
Patent Leveled

Uniform Blue
Wellsville Polished
Bill Poster's
Partition Steel

Electrical
Tool Steel
Lead Coated (Ternes)
Armco Ingot Iron

Armco Galvanized
Armco Enameling
Corrugated Armco
Corrugated Steel

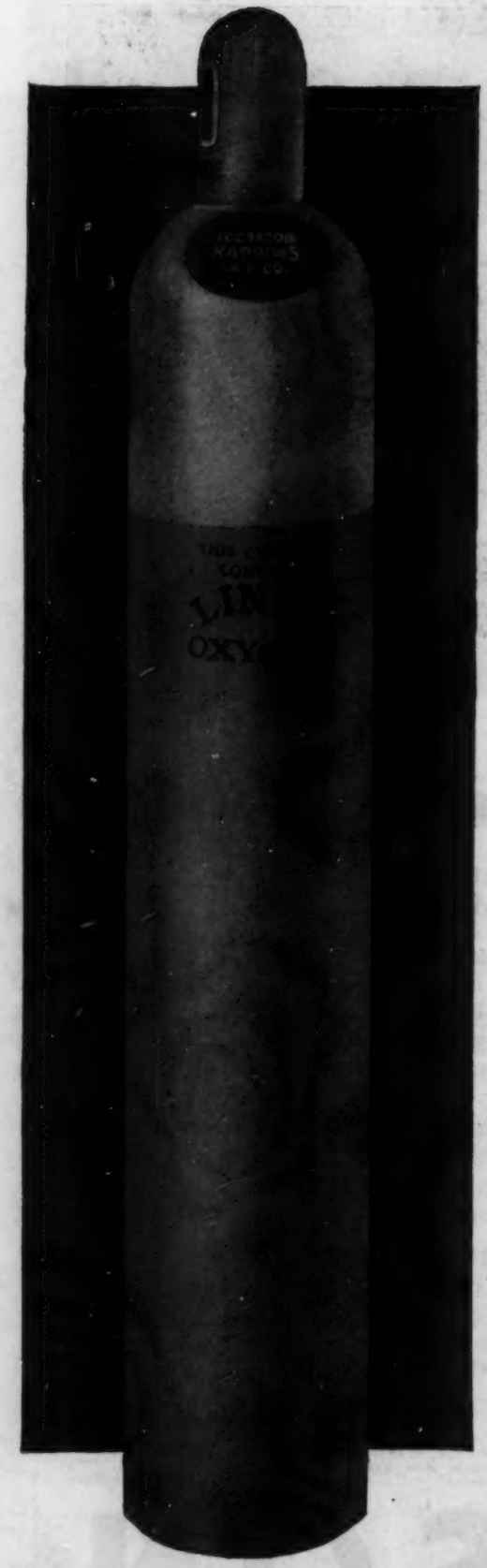
WRITE FOR THE JOURNAL AND STOCK LIST—"KEY" TO IMMEDIATE STEEL

JOSEPH T. RYERSON & SON INC.

Plants: Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Jersey City
Representation in: Minneapolis, Tulsa, Newark, New York, Denver, Los Angeles, San Francisco

RYERSON

85 YEARS OF STEEL-SERVICE



It isn't in the written contract

When you buy Linde Oxygen, you get not only a high grade product, the standard for more than 20 years.

And fast delivery service from the nearest of 48 plants and 105 warehouses.

But also Linde Process Service, always ready to help you get the best results in the most economical way.

It isn't in the contract, but it goes with every cylinder.

THE LINDE AIR PRODUCTS CO.
Unit of Union Carbide and Carbon Corporation

49 PLANTS UCC 102 WAREHOUSES

General Offices: Carbide and Carbon Building
30 East 42d Street, New York

LINDE OXYGEN

American Artisan
The Warm Air Heating and Sheet Metal Journal

Vol. 96 CHICAGO, JULY 21, 1928 No. 3

It Wasn't the Lady's Good Looks, But the Sheet Metal Contractor's Natural Desire to Be Courteous That Made Him Say What He Did at This Particular Moment

Cookie Cutter Incident Nets Contractor HANDSOME SHEET METAL JOB

Wins Confidence of Customers by DESIRE TO RENDER REAL SERVICE

By George Duerr

THERE is no profit in hidden gold or service. On the other hand advertising which does not square with the facts is damaging to the advertiser.

A short time ago a sheet metal contractor was telling me of an incident which very well illustrates the truth of the statements with which this article is introduced. A woman came into the workshop of this contractor, inquiring whether or not she could have a small cookie cutter made. She informed the contractor that she had been all over town in her attempts to buy the device in question but had been unsuccessful.

The contractor, not wishing the lady to get the wrong impression concerning his shop, said to her: "Yes madame, we can make a cookie cutter for you of the type desired, but you don't want us to do that for you. Nor do we want to make it for you, because in the first place it will cost you about $2.00. And if we were to charge you $2.00 for so small an article, you would get the impression that we were trying to gyp you, which we would in truth be doing, regardless of the fact that this price would be our actual cost to manufacture the article.

"Well then," said the woman, "what would you advise that I do? I must have the cookie cutter."

"If I were you," said the contractor, "I would go down to the 10-cent store, where I am sure I could find just what I wanted in that line."

The woman thanked the contractor very kindly and left the store. About an hour later she returned and said, "I just wanted to tell you that I followed your advice. In the

10-cent store I did find just what I wanted for ten cents, but I came back because I wanted you to know how much I appreciated your kindness in telling me where I could get what I wanted."

Now this contractor had no way of knowing who the woman was or that she was likely ever to mean anything to him in a business way. But a few days later he had the pleasure of being called to her home, which was quite a spacious one, for the purpose of renewing the gutters and downspouts on the home, netting him a contract running into considerable money. There was not a question of price on the job. The job went to the contractor because of his attitude on the former meeting. The woman explained to him that she had complete confidence in him. "She knew," she said, "that any man who could be so kind and who had common courtesy enough to stop his work and explain to her where she could get what she wanted was a man who could be trusted to do the right thing on all occasions."

The explanation about the cookie cutter probably took ten or fifteen minutes of the contractor's time. But in those ten or fifteen minutes he had shown a prospective customer that his organization is a service rendering entity, which was all that was necessary in this case. By so doing he won not only a customer, but an individual of the public who is going to tell others about the fairness of this contractor and they in turn are going to call him in to do their work and become advertisers for him.

The difference between this contractor and many another with an equal amount of ability in his profession is that the former tried to be of service to the public. It would have been an easy matter for this contractor to have dismissed the woman with a statement that he could not supply her wants. In doing so he would have been truthful and not necessarily discourteous. But the fact that he did take the trouble to explain to her why it was impossible for him to make the cookie cutter for her and then going a little farther and telling her where the device could be obtained proved that his advertising does square with the facts; consequently he reaped the reward that is justly his, without having to fight competition.

It is not the intention of the writer to create the impression that this contractor does not have all kinds of competition to meet. He does, just as any other contractor does. But the point it is aimed to bring out is that establishing a reputation by actual deeds of service for fairness, the contractor wins the confidence of people in his territory who are perfectly willing to do his advertising for him. And a great deal of business comes to him in this way that costs him absolutely nothing; it brings a customer to him in a frame of mind to pay for actual service rendered, because that customer has been convinced by an outsider of the contractor's endeavor to be fair in his dealings and that he is reliable. Competition does not enter into getting work of this kind.

Few people know or understand the intricacies of the sheet metal business. And when they question the prices charged it is up to the contractor to explain to them just what they are getting for their money. If you advertise service, then for the love of Mike so conduct yourself and your organization that your acts will prove that you are endeavoring to render service.

He Thought the Cookie Cutter Incident Closed So Far as He Was Concerned, and You Can Imagine His Surprise When It Netted Him a $300 Contract

Making Pattern for Leader Head Requiring Special Treatment

Eighty Per Cent of Learning Is Obtained by Sight—Eighteen Per Cent by Hearing

By O. W. Kothe, Principal St. Louis Technical Institute

JUST lately, I attended a lecture, where an able professor told us how we learn things, and while listening I could not help wishing that all of my sheet metal readers could have heard it. But the gist of the lecture was:

Eighty per cent of what we learn comes into the mind by what we see with our eyes. That is by reading, by seeing pictures, drawings, demonstrations etc.

Eighteen per cent of what we know comes in through the ears, as what others tell us, class lectures, etc. A lot of this is misinformation, and is therefore, valueless, as when fellow workmen tell you the wrong solution to a problem.

Two per cent is what we learn with our hands. That is the knowledge of handling tools, of working metal, and constructing the work by means of physical application. We can say this is the knowledge the apprentice serves his four years for, to break in his hands and body, to work metal in prescribed ways. And a lot of men never even learn this in an efficient or productive manner.

It did me lots of good to hear this lecture, as it substantiated theories I had been working under for years; namely, that the eye is the proper way to learn by—it is over 20 times faster than the ear, and it photographs more clearly than impressions that the spoken word makes. Most ear minded men make a serious mistake in thinking they can get more when they hear a man talk. In most cases their minds are sieves —the spoken word is not always in harmony with their past thoughts, and it glides away—is soon lost in oblivion. Where to use the eyes, to make drawings, mentally to photograph the pictures that good printed instructions make—that always is more lasting—more effective, and can be seen in a larger productive way.

We can confidentially say that the majority of sheet metal workers learn mostly by the 2 per cent and 18 per cent way, they use their eyes only to corect what they hear and do with their hands or tools. In this respect all that vast realm of trade knowledge we get by reading, is closed to them—because they do not believe in reading or using their eyes for instruction purposes. Possibly only about 8 per cent discard the apprenticeship teaching and study the technical parts of their trade by means of schools, books, drawing courses, etc.

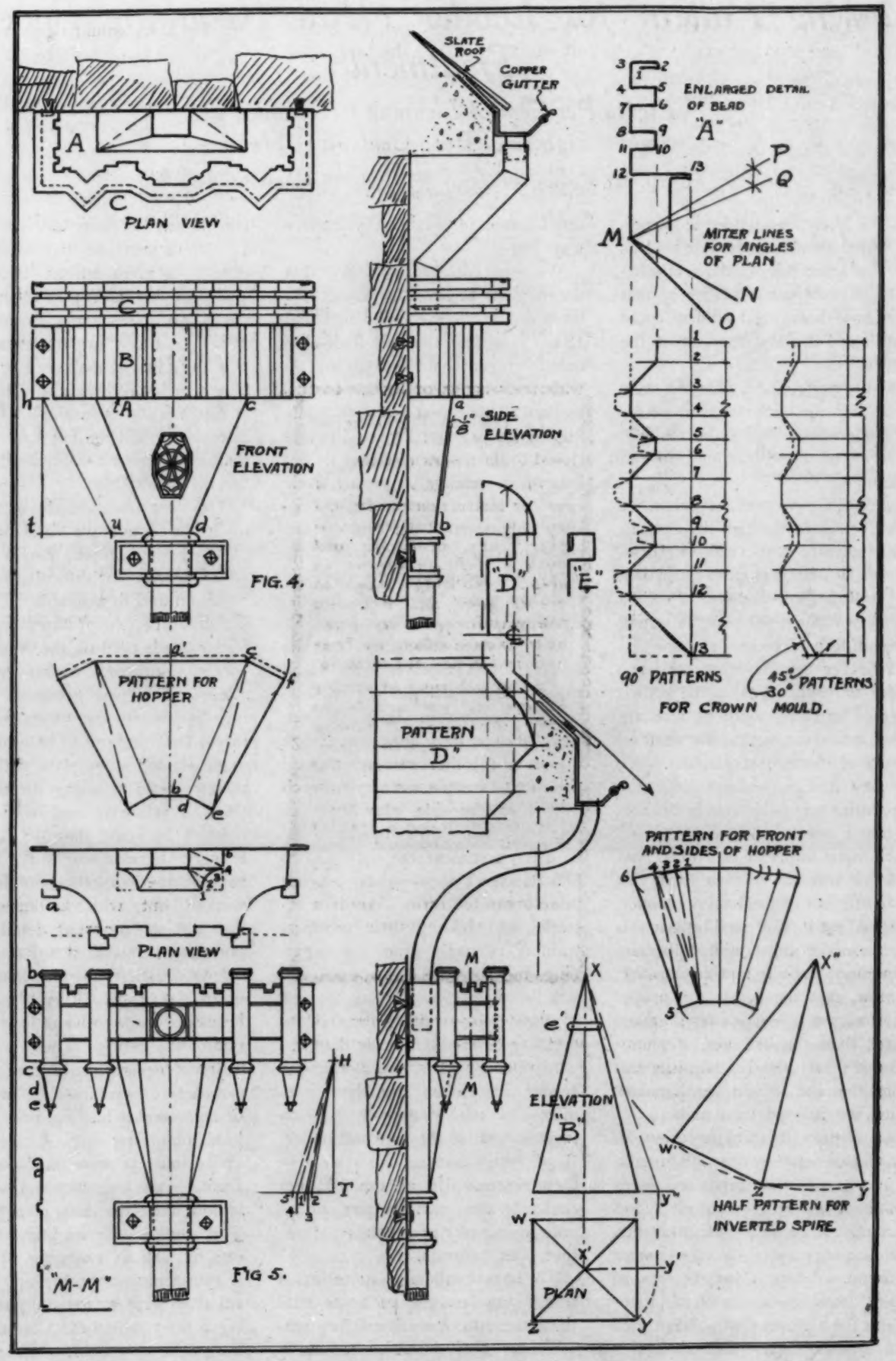
A lot of men still believe that the foreman or employer can teach them, and they will gladly pay $1.00 to $2.00 per lesson. But even then, few foremen have their knowledge organized so others can comprehend it. Most foremen who try to teach others on the side, play foxy, in that, they hop-skip-and-jump about so after a student has paid $50 to $75 he hasn't anything he can use in an organized form. Too often because not tackling their technical training correctly from the beginning, men become discouraged and will lull themselves to sleep the rest of their lives—waiting for the undertaker to knock at their door.

My point here is, that I want my reader friends to use thier eyes more—to read more—to develop their insight, so they see and understand things that are not always on the surface. Be of the 100 per cent He-man, where you utilize your eyes, ears and hands to further your interests.

To have confidence in technical things and be right at home with the better run of work means a person must train himself systematically. It is not just the pet things you fumble around every day with, but also the things you may need only once in a great while. It is this qualification that makes other people have confidence in a person. Men who take a few private lessons, or who peek into a book once or twice a year, will never acquire that higher qualification to inspire confidence in others. And the big idea here is that every person so trained must use his eyes to see.

Take for instance, the examples of leader heads we show in this plate are very simple when it comes to laying out, but difficult of interpretation and to assemble. Figures 4 and 5 are two of three types of leader heads used on the New Concordia Lutheran Seminary, St. Louis. This new group of buildings is one of the most beautiful pieces of design. The walls are made of thin stone slabs with wide mortar joints of a gray stone, with slabs of yellowish and reddish tint mingled here and there to blend in a very harmonious way. Every part of the numerous buildings is worked out with a fineness of line and sharpness of detail to be quite awe-inspiring to any man who enjoys artistic refinement and beauty in Art itself. Even the leader heads are made to blend in with the rest of the design. There are three different designs, so arranged that a variety is visible—that sameness or monotony is lost sight of.

In observing Fig. 4, the three views must be associated together, from merely the front and side elevation sufficient data is not clear. This design with its jogs and offsets as well as changing of shape is something interesting and different from what we generally see. Observe the tribble head C at the top, it is made very light, making it difficult to form an ordinary cornice



Pattern for Leader Head

brake. Then the body B, is made up of small jogs and offsets as the bottom A indicates. The hopper part is relatively long and narrow, with an ornament planted on the front, while the spout band is made with an offset for the flanges, but a small wall mould for the top and bottom.

Each of the spout heads are anchored by means of brass or bronze bolts into blocks of stone—not mortar joints as most men do it, but into the stone itself. All gutters are of the simple beveled copper design, where brass hangers are anchored to the roof and the gutters are riveted to them along the front edge. This allows for expansion and freedom of movement. It will be observed the amount of pattern drafting is limited on a design of this kind, the greatest part is accuracy of stepping off the girth, watchfulness in bending the several members, and good mechanical skill in assembling.

At "A," we show an enlarged detail of the bead members, and below we show the development for the three kinds of miters used. In this case the 90-degree miter is projected the same as any square miter pattern, while the 45 and 30-degree patterns are set out by the use of dividers, since space does not permit their projection. In our case the line 12-M-N is the 45-degree angle, with the miter M-P and 12-M-O is the 30-degree angle, with M-Q as the miter. These miters are located by bisecting the angles as shown. When lines are dropped from detail "A" to these miter lines, the line 12-13 can be used for picking the several distances and so transfer them into pattern.

The hopper is best developed by drawing a center line as a′-b′ equal to a-b of side elevation, and then measuring the front widths. Then draw the hip lines, and pick the side widths and place them in pattern by means of describing arcs. Then develop the diagonal line shown plan by using the diagram h-t-u, and pick true length h-u, and with c in pattern as center, cross arcs in point e. Then pick c-d of front elevation and set as e-f, and you have the pattern for hopper. The back side is secured by reproducing the back elevation, and seaming the other parts to it.

We can get at the spout band by drawing a detail as at "D," and then develop a square miter pattern from it as at "D." This is followed the same as all 90 degree miters and consists of picking the girth from the section "D," setting it off below the detail, drawing stretchout lines and then from each point in detail drop lines or points to cross lines in pattern of similar number. This allows sketching in the miter lines. The front and sides of spout are provided with an extra mould as shown, but on the wall flange it is omitted, making the flange as detail "E" shows.

To sell what you have, to increase your business, make the facts known.

The advertising must not be done spasmodically and in a haphazard manner, but regularly and with a definite object in view. Nothing can so create good will between the public and any business organization as true and judicious advertising.

After all most of us are honest and inclined to do the right thing. One thing which handicaps in a business way is suspicion, and suspicion originates from an imperfect acquaintance. Proper advertising creates a spirit of good will. Time and time a g a i n it has brought greater returns in business, better service and greater economy for the public.

The ornament in the center of the hopper would be quite difficult to make owing to the smallness of its widths and projection. However, on a large job such as this Seminary requires, the ornament could be purchased stamped out. Even this will be costly, since a special die must be moulded for the stamping purposes. The matter of cutting out along the lines would be a careful job and could also best be done by a steel die or miter machine. However, only a few such ornaments would be made by hand, and presents quite a tedious job.

Our design Fig. 5, has some points in common with the Feudal Castle battlements, as well as certain refinements that harmonizes with the structure. One thing about all of the Seminary leader heads, they are relatively small, that is narrow and low, which condition harmonizes perfectly with the rest of the building. Huge box like heads do not serve any purpose outside of being cumbersome, because if a pipe is stopped up—a large head will overflow as readily as a small one. If a head is of sufficient size to allow for the readjustment of the waters flowing from the roof, allowing for air venting, that is about all we can expect of a leader head, outside of its ornamentation.

By a study of our front and side elevation as well as plan, we see very little pattern drafting is necessary but the effect is produced more by straight lines, joggs, and offsets as well as a few well placed curves. The posts on the corners are merely planted over the box part which makes these as auxiliary ornamentation. Observe, the girth for the box would be picked from the outline of plan, working in all the offsets, curves, etc. In the body two very small fillets are placed to relieve the monotony of plane surfaces. At "M-M" a section of M-M of side elevation is shown, which also shows the small rolls which shape the battlement effect.

Possibly the hopper offers the most interesting part for pattern development. Here the plan of hopper is treated much like a square to round, working by triangulation, and dividing the cove portion in equal parts and drawing lines to the corners. Then design the diagram of true lengths, where H-T is the height of hopper, and the points as T-1-2-3-4-5 are picked from plan much the same as a square to round. The pattern is then set out much the same as former hoppers, only

developing the cove by triangulation, as indicated by our pattern.

Other items of development is the inverted pyramids on the square posts of our elevation. This is shown at "B" which is an enlarged view. Here we draw the elevation to the size desired, and then draw the plan view. After this we pick the hip line x-y and can transfer it with dividers or by projection to y," thus giving x'-y" as the true length. With this radius, we set our dividers to any place as x," and describe an arc. With dividers pick one of the sides of plan as w-z, and using any point on this arc to start with and step off the four sides as w-z-y, etc. In our case space only permits two sides, but all four can be marked off, lines drawn from one point to another and a lapedge allowed, which produces the pattern.

Other small members, as the crown mould b and the base c can be developed identically like a square miter pattern. The small fillet e, on the pyramid, or as e' of "B" can be a small copper wire wrapped around at this point and soldered. Very small offsets of this kind placed within the metal itself are hard to make, being so small. Of course, they can be made, but an external wire planted around serves the same purpose, and will not be noticed from below. The spout bands are made identical to that shown at Fig. 4, and so does not need further comment.

We should add, that work of this kind will fool most men, taking considerable longer to execute than a person would at first imagine. Men who are used to working in copper and on particular work can do much better and faster than men working mostly in galvanized iron or tin. Men who are not working in copper most of the time, can easily take twice as long to do such work and do no better job either than men working in copper most of the time. Experience counts and it is up to the individual to get as much of it as possible.

Shops doing estimating often overlook this factor, and while technically speaking sheet copper is worked the same as sheet iron or tin, still workmen not so at home with copper, take longer. They know it costs several times more, and so they are more careful until they get broke in, when the job is done. Leader heads like we show should have no solder shown on the outside at all, and if such soldering must be done, the solder is sweated in, and scraped off clear to the copper. Soldering irons must be well shaped and in good condition, and care must be taken with the acid so it does not run over places where it is not wanted.

Men not used to copper, are more anxious and handle the metal much more than necessary. In this way their fingers soon perspire and the acid marks and finger grease soon disfigure the surface to look dirty and sloppy. They want to do a nice job, but the acid runs on them and their finger marks get stamped all over, the soldering copper slips and makes solder streaks, and when they get it done—they are glad, but what a sight! However, men who work in copper considerably treat it just like galvanized iron and do not let themselves get nervous, and as a result, a neat clean piece of work is done in half the time.

This also tells outside roughing in men that their chances at better shop work is quite remote because, outside men acquire a different view point than inside men. Strong heavy outside work breeds strong mental vices, and this does not train men into refinements of the eye and the hand. Nearly every inside man know the very unsatisfactory work outside men do when called into the shop to help out—it is coarse, rough —often slip-shod and too often dirty and sloppy. In fact most outside men are ashamed of their own work when put in the shop. This shows they have a finer feeling and understand how a thing should be, but have not the practice, the patience or the training to achieve this destinction.

If such men will take up a good program of Sheet Metal Design and Pattern Drafting—they will amaze themselves at the polishing this will give them. When a person does sloppy drawings, and when a teacher like myself refers them back to him—it hurts his feelings. But next time he does better work, and each time after that he seeks to improve—so that in a year or two, what used to be rough and sloppy workers show a wonderful improvement in neatness, accuracy and efficiency. In fact most such men have done very creditable and by this extra training they have won shop distinction and sometimes even surpassed older untrained men. It all goes to show what can be done if men only want to improve themselves.

The king is dead, long live the king! The average span of activity in human affairs is estimated to be about 33 years. Assuming that this is true, it would appear that each year about 3 per cent of the existing market disappears and another three per cent takes its place, or in other words, every 11 years one-third of an industry's market has gone and another third has arrived.

The third that is moving out is composed of people who grew up in the age that believed in the products of a certain industry—steel, for instance. Will the third coming in believe this is an age of steel, or of cement, or something else? What are they going to believe is going to be the best form of construction, or the best form of heating?

The permanency of any industry will depend upon the education this incoming third receives. And advertising is the only medium through which that incoming third can receive the education desired.

Rufus C. Phillips, Armco Secretary, Dies Following Long Illness

Long Associated With Geo. M. Verity, President of Armco

RUFUS C. PHILLIPS, 63 years old, Secretary of the American Rolling Mills Company, a brother-in-law of George M. Verity, President of the concern, and prominent in civic and religious affairs as well as industrial and business circles, died at a hospital in Middletown, Ohio, July 11, following several weeks of illness.

Mr. Phillips was born at Georgetown, Ohio, and when but 16 years old became acquainted with George M. Verity, forming a friendship that had lasted throughout the years and which had linked the lives of these two men in founding one of the most prominent steel industrial plants in this country, the American Rolling Mill.

Mr. Verity entered the steel mill business at Cincinnati in 1888 and three years later was joined by his former boyhood friend in organizing the plant here. At that time Mr. Phillips was placed in charge of the sales department, and until illness compelled him to withdraw from active interest at the mill he continued to have charge of this department.

The Young Men's Christian Association here was a hobby of Mr. Phillips, and its present successful status is due mostly to his untiring efforts as an official. He was the first president of the institution and at the time of his death was a member of the Board of Directors. The Young Men's Christian Association today is in reality the outgrowth of what formerly was known as the Presbyterian Brotherhood, an organization founded by Mr. Phillips.

Mr. Phillips also was instrumental, after the flood of 1913, in founding the Social Service Bureau, an organization that grew to a prominent position here and that continues to operate as one of the 17 branches of the Middletown Civic Association. In church circles, the decedent was untiring, not only as an elder of the First Presbyterian Church, but as an official of the Sunday school and President of the Butler County Sunday School Association.

In 1888 he married Miss Fannie L. Standish, and reared a family of six children; Standish, of this city,

Rufus C. Phillips

Rufus Colfax, Jr., of New York City; George and Dean, of this city; Lucretia and Mrs. Dorothy Hake, whose wedding here was an event of a few months ago.

Mr. Verity, probably the most intimate friend of the decedent today paid tribute to him:

"Mr. Phillips was a man with an exceptionally admirable nature, which enabled him to make strong friends both for himself and his company. He has always been much loved by members of the organization and by all of his friends and acquaintances. He was a man of fine intellectual attainments, a great reader, a great traveler and a great lover of flowers.

"He was never athletic but had great pleasure in spending his spare time with his family and with his flowers.

"In the death of Mr. Phillips, the American Rolling Mill Company loses one of its stanchest supports, the industrial world a real leader, the church an ardent worker, the city a splendid citizen and the family a magnificent husband and father."

Illinois Auxiliary to Issue Roster in August

The officers and executive board of the Travelers' Auxiliary to the Illinois Sheet Metal Contractors' Association held an informal get-together meeting Saturday, July 14th, at 620 South Michigan Avenue, Chicago, to talk over plans for the coming year.

As usual, the Annual Roster for 1928-29, on which paid members are listed, will be printed in August.

Membership is open to manufacturers, jobbers and wholesalers (and their salesmen) selling to the sheet metal, warm air furnace and kindred trades in Illinois, either by mail or through salesmen.

The annual dues are $7 and should be mailed promptly to Secretary Miss E. Cohn, 6756 Crandon Avenue, Chicago.

Those present at the meeting were: Frank Frazer, president, J. V. Arnhorst and Miss Etta Cohn of Chicago; Jack Barclay, Jack Sauer and H. J. Niehaus of Peoria, and A. P. Halm of Ottawa.

Page Mr. Wagner and Mr. Feiten! A Reader Wants to Know

"Anyone reading the pages 184-185 of your issue of June 30th, and then attempting to compare the figures of the winner of the contest as to the sales price of the metal work on the house submitted, must have his curiosity aroused as to just how Albert J. Wagner arrived at his unit price per foot, per chimney, and per gable, when compared with the official estimate.

"Assuming that both prices are correct, this certainly presents a fine opportunity for the AMERICAN

ARTISAN to do a splendid service on this the most important part of our business, if it could persuade Mr. Wagner to go into detail as to how he arrived at his prices. Possibly in accepting the prize he might feel it his duty to do so.

"If William Feiten would tell how he arrived at the 33⅓ per cent of material and labor equaled the overhead that, too, would be interesting.

"It has been a long time since an opportunity of this kind with facts and figures has been presented on an actual job, and if both these gentlemen are tolerant enough to withstand constructive criticism and ignore the rest, and AMERICAN ARTISAN lends its pages to the pertinent side of this matter of figuring new 'jobs,' it certainly would arouse many men, who just guess and lose because of ignorance, to their folly.

"It is too true that many men figure wrongly simply because of ignorance, and because of this the men responsible for the presentation of this example knew it to be too true. What an opportunity.

"P. S.—If the job has been completed, just what is the true cost?"

A READER.

Sheet Metal Trade of Indianapolis to Enjoy Annual Picnic

The annual picnic of the Indianapolis sheet mtal trade will be held at Long Acre Pool, near Indianapolis, on Thursday, July 26th, starting at 10 a. m. Those attending will bring their lunches for a general spread, excepting that coffee, pop, candy and ice cream will be furnished by the committee.

These annual outings have proved very popular and the turnouts have always been good. Last year, in a driving rain starting early in the morning and continuing most of the day, a matter of one hundred and fifty people came and enjoyed themselves immensely, even though their activities were largely confined to the pavilion and swimming pool. The rain on that occasion was very much in evidence. It is said that Joe Gardner came walking up to Homer Selch and asked him the location of the swimming pool, and Homer replied, "That was it you just came through." Whether this story is 100 per cent true or not, the fact remains that the turnout was remarkable under the conditions. The indications are that there will be from three to five hundred in the group this year, if the weather man lays off of them. In any case, the pavilion is much enlarged and the picnic will progress, rain or shine. This picnic embraces the entire sheet metal and warm air heating trade in Indianapolis, and is not an organization affair, although it is sponsored by the organization. The association is asking the co-operation of all phases of the trade, including non-members, manufacturers, jobbers and salesmen, in making the picnic a truly representative gathering and a success.

The picnic committee invites sheet metal and warm air contractors from all over the state of Indiana to attend the picnic as the guests of the Indianapolis contingent. There will be no attempt to make of the affair anything but a good time. It is hoped that a goodly representation of out-of-town contractors will accept this invitation. The invitation is general and applies to every contractor in the state. It is not being issued through any medium excepting general publicity primarily through the trade papers. All contractors in the state, however, will understand that each of them is cordially invited. Out of town guests call the Central office, Riley 2291.

The general picnic committee, made up of Thos. V. Lavery, chairman, J. T. Pope and J. F. Richwine, have perfected a very comprehensive organization for working out the details of the picnic.

Gibb Welding Machine Company, Bay City, Mich., Increase Capital Stock

The Gibb Welding Machines Company, Bay City, Michigan, makers of arc, spot, seam and butt welders, has increased its capital stock by $125,000, making a total of $250,000.

A Word of Logic on Roofing Guarantees

I sometimes wonder whether we are selling Guarantees or Roofing. We hear more about Guarantees, it seems, than we do about Roofing at present.

In the recent past I happened to learn of an instance in which an architect wrote a specification for a public building, and if my memory serves me correctly, the particular kind of roof, or its equal, was not specified. The specifications said that the roof was to be guaranteed for twenty years.

Many of us have been trying to cut this guarantee from twenty years to two years. Just why should roofers be asked to guarantee a roof for twenty years when no other trade is asked to guarantee a thing for any length of time? It would be better for them to first ask if we are certain we are going to live twenty years. If we had any way of knowing, then there might be some excuse or reason for them to ask us to make the guarantee for twenty years or for the period of our natural life. Should we be spared for twenty, thirty or forty more years, we can just sell them a guarantee and put on anything for a roof, and go ahead, for we are no more sure that the architect or owners will live twenty years than we are that we will. Then why should we go into long guarantees.

Shouldn't folks be reasonable, and not ask any more of the other fellow than they are willing to give themselves were they in his place?

And then, what is a guarantee worth after we roofers are dead, anyway? Will it keep the water out?

Fellow roofers, let's be men in the future, and sell ourselves, our reputation, and our personality to the architects, contractors and public as a whole, and quit so much talking about Guarantees, for a Guarantee at best amounts to no more than the man or the company's moral obligation or standing in the community in which he or it lives or exists, as the case may be.—*Tri-State Bulletin.*

SEARCHLIGHT OF PUBLICITY Best Cure for Bid Peddling Menace

Thorough Exposé of Price Cutting Practice Will Teach Owners Detriments

CONTRACTORS and sub-contractors in all phases of the building industry are beginning to view in a serious way the detrimental effects upon the building industry of the bid peddling practice. Some very pertinent remarks on this subject are made by Alex Simpson, Secretary of the Denver branch A. G. C., who is fighting for fair and ethical business methods.

"I am deeply interested in this subject because I feel that publicity is the best weapon which we have for use against the pernicious practice of peddling bids. Few really responsible contractors or sub-contractors will fall into the traps which are frequently set for them once they fully realize the inevitable consequences of such procedure. Few architects will become a party to the nefarious schemes, and few owners will resort to them when they come to appreciate thoroughly the many pitfalls which underlie such practices. Every meeting at which contractors, sub-contractors and material men get together and discuss the situation, every article on the subject that is published in a contractor's, sub-contractor's journal carries a lesson to someone. Everyone concerned with the contracting business must be educated to regard that business in its true character. The only way to accomplish this is to keep on presenting the facts to them in examples that will strike home.

Contractors and sub-contractors themselves, in many instances, appear to have an inferiority complex, instead of regarding their efforts as a perfectly legitimate and dignified business.

"Though tangible results, from the efforts of the few contractors who belong to local contractor's organizations are hard to check, I feel that contractors, sub-contractors, material men and architects are all awakening to the seriousness of the situation. I believe that there is a growing recognition of the fact that every contractor who can furnish a bond is not qualified to undertake large contracts. I think that there is a growing tendency on the part of architects in this territory to exclude the incompetent or irresponsible bidder, even though his bid is lower and he is able to furnish the required bond.

"As for the material men, particularly the lumber dealers, they are feeling keenly the effects of unethical tactics in the building field and meetings have been held lately, with a few contractors present, to discuss ways and means of combatting the evil. About all that has been accomplished to date, however, is the appointment of a committee of three contractors and three material men to try and thresh the matter out. The lumbermen have been particularly hard hit, both with bad accounts of fly-by-night contractors and the shopping about for materials which reckless bidding has forced the contractors to do in trying to save themselves from loss."

As an example of the growing tendency on the part of owners and architects to place contracts with contractors of unquestioned experience and responsibility, mentioned by Mr. Simpson, a recent case in a western city is noteworthy.

A job worth in the neighborhood of $60,000 was put up for bid. Twelve bids were presented, some of them by responsible contractors, others by those whose standing was not so good. It so happened that the lowest bidder was a contractor who had failed in business, and whose chances of successfully carrying out the contract were very doubtful, although he could probably have furnished the usual bond. The owner naturally wanted to save all the money he could on the job, yet he was just as determined to have it performed in a workmanlike manner and without a slip up. He accordingly approached the fourth lowest bidder, whose standing was unquestioned, and tried to prevail upon him to lower his first bid, which was some $6,000 higher than the low bid. He was informed that the job had been figured by this contractor at the lowest price commensurate with sound business methods and that the bid would stand as it was.

Rather than trust the work to a contractor who was inadequately equipped for the work, or one whose ability was in doubt, this owner abandoned his shopping tour and awarded the contract to the responsible contractor, regardless of the fact that there were three lower bids and a difference of $6,000. This incident goes to show what might be accomplished if all contractors would make their "first price the last price."

Wisconsin Sheet Metal Men Meet in Milwaukee

The Master Sheet Metal Contractors' Association of Wisconsin held its monthly meeting July 11.

The following members were present: C. C. Tolg, L. F. Reinke, W. Gehrke, E. B. Tonnsen, W. A. Belau.

A letter from Department of Commerce dated July 30 in reference to the Second Tentative Draft of a Uniform Mechanics Lien Act was read and secretary was instructed to send a copy to O. Geussenhainer to give this letter his attention and write whatever information he has to Paul Biersach.

Financial report of the National Association and of the National Contractor by W. C. Markle was read and ordered placed on file.

A letter from the National Industrial Conference Board in reference to experience with a five-day week employment was read and secretary instructed to write that the sheet metal industry in this locality has had no experience with the five day week labor.

Random Notes and Sketches
By Sidney Arnold

"The essence of humor is sensibility; warm, tender fellow-feeling with all forms of existence."—Carlyle.

It was quite a happy surprise to see our old friend, Blair Quick of Des Moines again.

Blair was in Chicago this week to attend the sales meeting of the Delco Light Company with whom he is now affiliated.

Blair's many friends in the warm air heating field will be sorry to learn that he has left the field but at the same time will rejoice to know that he is happy and prosperous in his new connection.

* * *

There is an anecdote in the warm air heating and sheet metal industries told of Herb Symonds and Jules Gerock, Jr., well illustrating the attitude toward life of both of them.

They were standing beside each other in New York before a rare tapestry that Herb wanted, but felt to be an extravagance. Herb said thoughtfully, "I suppose I oughtn't, but it's a great temptation."

Jules retorted, "Always resist everything, Herb, except temptation."

* * *

Natural Error

Harry Neal, Indianapolis, was trying out his new automatic shotgun at the expense of a hawk that had been getting a bit too rough with the chickens on Harry's country estate. Just as he started his bombardment, his wife in the house turned on the radio.

"Well, what do you know about that?" she exclaimed. "I've got Chicago!"

* * *

What's In a Name?

"I beg your pardon," said the hotel clerk, "but what is your name?"

"Name?" echoed the guest, Roy Wasson, who had just signed the register. "Don't you see my signature there on the register?"

"Yes, sir," answered the clerk. "That aroused my curiosity."

Some few days ago I ran on to an old photograph that was found in our "morgue." As I looked at the face before me I noticed something strangely familiar about it. It seemed to me that I had seen the man somewhere in the ranks of the sheet metal men, but rack my memory as I would I could not recall him. I can well imagine that in his younger days he must have been quite a ladies' man. Perhaps some one of my many readers will recognize him and tell me who he is. I am very curious to know.

— ? —

No Foolin'

Charlie Tharp, Fort Wayne, Indiana was discussing the hereafter with one of the colored servants.

"Sam," he said, "if you die first I want you to come back and tell me what it's like over there. If I die first I'll come back and tell you what it's like."

"Dat suits me, Mistah Tharp," replied the old Negro, "but if you dies first Ah wants you to promise me dat you'll come back in de daytime."

* * *

Proof Positive

Young Thing—"I have brought this book back; mother says it isn't fit for me to read."

Librarian—"I think your mother must be mistaken."

Young Thing—"Oh, no, she isn't. I've read it all through."

* * *

Unreliable

R. C. Walker, the boss: "But you asked for a day off a month ago because your wife was dying, and now you ask for another for the same reason."

Clerk: "Can't help it, sir; I am very sorry, but you can never depend on my wife for anything."

* * *

Modern Literature

Author (reading from manuscript): "He knelt and raised the hem of his sweetheart's skirt to his lips."

Platte Overton, his friend: "Stop! That should read, 'He knelt and raised his lips to the hem of his sweetheart's skirt.'"

* * *

I had the pleasure of a visit to our office on Thursday of this week of C. E. Hodges of the Richardson & Boynton Company, New York. Mr. Hodges said he had come to Chicago on business, but I shouldn't have been the least bit surprised if I had learned that he had been attracted to our fair city by the fact that Miss Amelia Earhart was to arrive here on that day, which she did and received a royal welcome. We enjoyed having Mr. Hodges visit us.

* * *

Financial Advice

Telephone Operator: "I have your party. Deposit five cents, please."

Souse at Pay Station: "Whatzzat?"

Operator: "Please deposit your money."

Souse: "Listen, girlie, wat I wan's a conversah'n from a fren,' not financial advice from a stranger."

City of Chicago Now Ready to Enforce Standard Furnace Ordinance

Inspectors to Be On Job—Necessary Forms All Ready for Operation

THE City of Chicago is all set now to go forth with the enforcement of the Standard Furnace Ordinance, a copy of which is reproduced on other pages of this issue. This information was divulged by President L. M. Burt of the Greater Chicago Warm Air Heating Association at its meeting in the Sherman Hotel Monday evening, July 16. The printing, even to the stickers of inspection that are placed on furnaces, is all in shape and everything is in readiness to go forth with the enforcement as required by law.

The forms that will be used in the system will be an application for permit card which will give the name of the applicant, the location of the work, the make of the furnace to be installed, the size of the fire pot, the size of the casing, and the capacity in square inches of pipe area, together with other pertinent information. This card, a reproduction of which is given herewith, is sent to the office of the building commissioner by the heating contractor as soon as the contract has been taken, together with the permit fee of $5.00. The permit is issued, but the card is retained in the office

Application for Permit **City of Chicago** **Warm Air Heating**

NAME OF APPLICANT _____

STREET _____ CITY _____

ADDRESS WHERE WORK IS TO BE FOUND _____

MAKE OF FURNACE TO BE INSTALLED _____

SIZE OF FIREPOT _____ SIZE OF CASING _____ HEIGHT _____

CAPACITY IN SQ. IN PIPE AREA _____ REQUIREMENTS IN SQ. IN. _____

AREA OF ALL HEAT PIPES _____ AREA OF ALL COLD AIR PIPES _____

NAME OF ROOM	HEAT LOSS SQ. IN.	PIPE SIZE	NAME OF ROOM	HEAT LOSS SQ. IN.	PIPE SIZE

FEES

$5.00 EACH INSTALLATION

$1.00 EACH ADDITIONAL RUN OR STACK FOR FURNACE ALREADY INSTALLED

MAIL THIS APPLICATION WITH FEE TO COMMISSIONER OF BUILDINGS, ROOM 702, CITY HALL, CHICAGO

Above—Reproduction of Application for Permit to Be Filled Out by Furnace Installer When Contract Is Signed. Below—Reverse Side of Application for Permit Which Inspector Fills Out After Making Each Inspection

FIRST INSPECTION _____ DATE _____

REMARKS _____

WARM AIR HEATING INSPECTOR

SECOND INSPECTION _____ DATE _____

REMARKS _____

WARM AIR HEATING INSPECTOR

of the building commissioner. When the contractor is ready to have the first inspection of the job made he sends in a second card to the office of the building commissioner. A reproduction of this card is also given herewith. The card sent out for both the first and the second inspections is one and the same.

Upon receipt of the second card, the city inspector for that territory goes out to the job, taking the application for permit card with him. On the reverse side of this permit card he makes the notations required, as shown by the form reproduced herewith.

Chicago, Ill. ..... 192.....

No. ..... Street Avenue

Heating Contractor .....

Permit No. ..... License No. .....

(Insert what work ready) .....

.....

.....

at above address will be ready for inspection on the date of ..... 192.....

Remarks: .....

.....

.....

.....

Heating Contractor

NOTE: Fill in above form and mail to Department of Buildings, Chicago. (24 hours notice required.) (over)

Card Used to Notify City Building Department That Inpection Is Desired. This Card Used for Both Inspections

The inspectors are on the job and are doing the work required of them. The unions are following the matter up very closely.

In the matter of the surety bond, President Burt explained that the rates on this have been set at $5.00 per thousand. As the surety bond requirement is for ten thousand dollars, this calls for a $50 fee for the surety bond. This is independent of the $50 license fee requirement. The surety bond is being handled through Louis E. Golan Agency, Inc., 134 North La Salle Street, Chicago, and is being received by the Hartford Accident and Indemnity Company. The forms to be filled out for surety bond application are also ready and can be had from Fred Goodall, Secretary of the Greater Chicago Warm Air Heating Association, 4224 West North Avenue, Chicago.

In regard to the formation of the furnace men's association on the south side of Chicago, Mr. Burt stated that the Greater Chicago Warm Air Heating Association has every desire to cooperate with the south side men. He feels as do other members of his organization that the south side men are laboring under a misapprehension of what the members of the Greater Chicago Warm Air Heating Association are trying to do. He also feels that if means could be invented to bring the two bodies together so that a thorough understanding could be had of the whole matter of the passage of the code and all that that implies, there would be no longer the desire to work at cross purposes.

Two charges were preferred against a member of the Greater Chicago Warm Air Heating Association. One for the violation of the Standard Furnace Ordinance and the other for using the association's stationery and name in getting contracts not lived up to. A motion was made to have the matter given immediate attention by the Board of Directors of the Association, who were instructed to investigate the charges and if found true, to take such action as they deemed necessary in the best interests of the association and of the warm air heating industry in the Chicago area. The action taken will prove the efficacy of associated effort.

Ed Stahler of the G. & S. Stove and Furnace Company, introduced Platte Overton. Mr. Overton, who was formerly with Herbert H. Davis Company, and who has opened an office in Chicago to give layout service on warm air furnace installations of all kinds, spoke briefly but encouragingly on the future possibilities of the warm air heating industry development. He revealed to his audience how it is possible to heat a building of almost any size with warm air. His talk was very instructive.

L. D. Burroughs Appointed Sales Manager of Midland Furnace Co.

Fortunate indeed is the executive whose early life jerked him forcibly, roughly and unceremoniously through the rudiments of his chosen business. If the things he learns then and there stick, he arrives better equipped for his job. If his early training profits him not, he simply does not arrive, that's all.

L. D. Burroughs has arrived. He spent his boyhood working in machine shops, foundries and factories. He is proud of his years of

L. D. Burroughs

experience in the office of the International Heater Company of Cincinnati, Ohio, where he rose from an order clerk to assistant sales manager.

In 1917 he was sure that he could

sell and equally sure that the warm air furnace business was just about ready to start forward toward its rightful place in American industry. He then made a connection with the sales division of the Monitor Furnace Company, a position he held for ten years.

Now, fully equipped with a jolly good nature, he joins the Midland Furnace Company of Columbus, Ohio, as their sales manager.

•

Professor V. S. Day Leaves University of Illinois for the East

Will Enter Commercial Enterprise in New York City

PROFESSOR V. S. DAY of the Department of Mechanical Engineering leaves the University to become Engineer of the Gas Heating Division of the Carrier-Lyle Corporation, 39 Cortlandt Street, New York City.

For the past ten years Professor Day has been engaged on the investigation of warm air furnaces and heating systems which began in October, 1918, under a cooperative agreement between the University and the National Warm Air Heating Association. Almost immediately following his discharge from military service after the Armistice he was appointed Special Research Assistant in Mechanical Engineering attached to this investigation, advancing finally to the position of Special Research Associate Professor in Mechanical Engineering, which he held at the time of his resignation. He devoted his full time to this work, and is co-author with Professor A. C. Willard and Professor A. P. Kratz, of various bulletins of the Engineering Experiment Station presenting the results of the investigation. He is also the author of Engineering Experiment Station Bulletin No. 117 entitled "Emissivity of Heat from Various Surfaces," and Circular No. 15 entitled "The Warm Air Heating Research Residence in Zero Weather," as well as numerous papers on the subject of Warm Air Furnace Heating appearing in the Transactions of the American Society of Heating and Ventilating Engineers.

During the period of Professor Day's connection with the investigation, the Warm Air Heating Research Residence at 1108 West Stoughton Street was erected and equipped by the Association. This Residence has made it possible to extend the laboratory studies to an actual modern residence which has been heated successfully with various types of gravity circulating warm air furnace systems. Such an unusual opportunity to correlate the technical work of the laboratory with the practical operation of an actual plant under winter weather conditions is without precedent, with the result that Professor Day is probably one of the best informed heating engineers in the warm air furnace field in the country today. In his new connection with the Gas Heating Division of the Carrier-Lyle Corporation, he will have an unusual opportunity to apply and extend his technical knowledge to the newest development in house heating, gas fired furnaces operating with fans.

Professor V. S. Day

In addition to his connection with the Warm Air Furnace Heating Investigation, Professor Day took an active part in the ventilation investigation for the Holland Tunnel under the Hudson River between New York and Jersey City, which was conducted at the University of Illinois from 1921 to 1924.

Professor Day was born in Springfield, Illinois, on May 14, 1894, and attended the primary and high schools of that city, after which he was employed as mechanical draftsman in machine manufacturing. He entered the University of Illinois in 1913, and graduated with the B. S. degree in Mechanical Engineering in June, 1917. After graduation he was a teaching assistant in the Department of Mechanical Engineering until he enlisted in the Air Service of the U. S. National Army in December, 1917, as cadet engineer, from which he was discharged in December, 1918, following the Armistice.

In 1922 he married Miss Marie Gunning of Champaign.

Professor Day is a member of Sigma Xi, Pi Tau Sigma, the American Society of Mechanical Engineers since 1918, and the American Society of Heating and Ventilating Engineers since 1924.

J. F. Quereau, who was assigned to this investigation to assist Professor Day for the past two years, and who is also a member of the Engineering Experiment Station staff of the University of Illinois, has been appointed, effective July 1, 1928, to succeed Professor Day. Mr. Quereau is a graduate of the University of Texas, B. S. in Mechanical Engineering, 1926, and of the University of Illinois, M. S. in Mechanical Engineering, 1928.

The investigation will, of course, continue under the general direction of Professor A. C. Willard, assisted by Professor A. P. Kratz,

Chicago Furnace Ordinance as Passed and Amended by Chicago City Council

THE following is the Chicago ordinance regulating the installation of warm air heating plants, passed by the City Council of the city of Chicago and amended April 18, 1928; as it has been published in booklet form by the Greater Chicago Warm Air Heating Association. Copies of this ordinance may be secured from Secretary Fred Goodall, 4224 West North Avenue, Chicago, at 10 cents per copy.

An ordinance governing the installation of gravity warm air heating plants in the City of Chicago and to be known as "Warm Air Heating Ordinance."

BE IT ORDAINED BY THE COUNCIL OF THE CITY OF CHICAGO, as follows:

Section 1. Definition.—A gravity warm air heating plant shall consist of one or more warm air furnaces, enclosed within casings, together with necessary appurtenances thereto, consisting of warm air pipes and fittings, cold air or recirculating pipes, ducts, boxes and fittings, smoke pipes and fittings, registers, borders, faces and grilles, the same being intended for the heating of buildings, in which they may be installed.

Section 2. Minimum Requirements.—The provisions of this ordinance shall be held to be the minimum requirements adopted for the protection of health, welfare, sanitation and the safety of the community and for the protection of the ultimate purchaser or user of the heating plant.

Section 3. Provisions in new buildings and in buildings already constructed. The following provision shall be complied with in any building wherein a warm air heating plant is or is to be installed:

A. Buildings Under Construction.

The term "new building" as used in this ordinance, shall be construed to mean buildings which have not been and are not inhabited.

(1) Where warm air register boxes, heads, pipes or stacks are to be installed, joists shall be set not less than sixteen inches (16") on centers and shall be butted and not lapped. Studding shall be set directly over and under joists, leaving a space of not less than fourteen inches (14") between studs and joists. Wherever joists are cut, headers must be put in to support joists. In all buildings having studded exterior walls, the floors shall be extended to the outside sheathing and all spaces between studding shall be closed at the attic floor line.

(2) All partition walls (or sections of these walls) in which heat stacks to second or third floor rooms are to be installed, shall be of sufficient size to accommodate stacks required to heat said rooms.

(3) In new construction, it shall be unlawful for anyone to do any cutting of woodwork for the reception of the wall stacks or baseboard registers except the general contractor or the contractor in charge of the work for him, or some duly qualified carpenter working under him. Where it is necessary to cut joists or supporting members, headers shall be put in and braced so as not to weaken the structure.

B. Buildings Already Constructed.

The term "buildings already constructed," as used in this ordinance, shall be construed to mean completed buildings which have been or are inhabited.

(1) It shall not be necessary to remove the plaster and lath from the walls where the new stacks are to be run, provided that stacks have proper capacity for connecting basement pipe and can be securely fastened together and shoved in either from above or below.

(2) On buildings already constructed, it shall be lawful for the heating contractor to do any cutting necessary for the reception of all appurtenances in the installation of a gravity warm air heating plant.

(3) Otherwise, installation of new work in buildings already constructed shall in general, conform to the provisions of this ordinance."

Section 4. Method for Determining Sizes of Warm Air Pipes, Wall Stacks and Furnaces.

A. Method for Determining Sizes of Basement Warm Air Pipes.

Rule A.
Each First Floor Room.
Divide square feet of glass by 12,
Divide square feet of net outside wall by 60 (See Table A),
Divide cubic contents by 800,
Add together the above and multiply by 9,
The result is the area of the basement pipe.

The sum of:
Glass (sq. ft.) (Par. 5C) ÷ 12
Net Wall (sq. ft.) (Par. 6C) ÷ 60
Cubic Contents ÷ 800

× 9 = Area of Basement Pipe

Rule B.
Each Second Floor Room.
Divide square feet of glass by 12,
Divide square feet of net outside wall by 60 (See Table A),
Divide cubic contents by 800,
Add together the above and multiply by 6,
The result is the area of the basement pipe.

The sum of:
Glass (sq. ft.) (Par. 5C) ÷ 12
Net Wall (sq. ft.) (Par. 6C) ÷ 60
Cubic Contents ÷ 800

× 6 = Area of Basement Pipe

Rule C.
Each Third Floor Room.
Divide square feet of glass by 12,
Divide square feet of net outside wall by 60 (See Table A),
Divide cubic contents by 800,
Add together the above and multiply by 5,
The result is the area of the basement pipe.

The sum of:
Glass (sq. ft.) (Par. 5C) ÷ 12
Net Wall (sq. ft.) (Par. 6C) ÷ 60
Cubic Contents ÷ 800

× 5 = Area of Basement Pipe

B. Basis of Working Rules for Pipes.

These formulae are for 70 degrees temperature difference outside temperature zero, inside temperature 70 degrees Fahrenheit. When temperature difference is more than 70 degrees, add 1½% per degree to final figures. When temperature difference is less than 70 degrees, deduct 1½% per degree from final figures.

The values as given in Table A for use in the working rules, Section 4, Rules A, B and C, are derived as follows:

EXAMPLE—

The factor 60 in Table A, Item No. 1, is based upon a co-efficient of heat transmission of 0.23 B.t.u. per square foot per degree difference per hour, thus:

$W \times 0.23 \times 70 \div 111 =$ sq. in. first floor leader to compensate for the heat loss through walls only. In this, W = net area of exposed wall in sq. ft.; 0.23 = co-efficient of transmission in B.t.u. per sq. ft. per degree difference per hr.; 70 = difference in temperature of air on inside and outside of wall; 111 = heat delivering capacity of 1 sq. in. of first floor leader pipe for a register temperature of 175° F. Reduced to its simplest approximate form this is $\frac{W \times 9}{60}$

Likewise substitute 167 for second floor and 200 for third floor in place of 111.

The values in Table A for the different types of walls were obtained by substitution of proper co-efficient of heat transmission instead of 0.23 in the above formula.

TABLE A

The factor 60 used in Section 4, Rules A, B, and C, is for buildings constructed as hereinafter set forth in Item No. 1. When other types of walls are used substitute the appropriate factor as follows:

No. 1.	Frame Wall constructed of siding, paper sheathing, studding, lath and plaster.....	60
No. 2.	Frame wall constructed of siding or stucco direct to sheathing (no paper), lath and plaster	52
No. 3.	9" Brick Wall (no plaster)	40
No. 4.	9" Brick Wall, plastered one side	48
No. 5.	9" Brick Wall, air space, furred and plastered.....	65
No. 6.	13" Brick Wall, no plaster.	53
No. 7.	13" Brick Wall, plastered one side	57
No. 8.	13" Brick Wall, air space, furred and plastered.....	75
No. 9.	4" Brick, 4" hollow tile, plastered	55
No. 10.	4" Brick, paper, sheathing, studding, lath and plaster (brick veneer)	68
No. 11.	8" Hollow tile stucco and plaster	67
No. 12.	8" Hollow tile, stucco furred and plastered	90
	ROOFS	
No. 13.	1" T. & G. Sheeting, Tar & Gravel	48
No. 14.	1" T. & G. Sheeting & Composition roof	40
No. 15.	1" T. & G. Sheeting & Tin.	24
No. 16.	Corrugated Iron on strips..	9.3

CEILINGS

No. 17 Lath and plaster without floor above 50
No. 18. Lath and plaster with tight floor above 90
No. 19. Metal without floor above.. 40
No. 20. Metal with tight floor above 70

C. Method for Determining Size of Wall Stacks.

1. First Floor Rooms.
   Same as Rule A.
2. Second Floor Rooms.
   Not less than 70% of basement pipe area as determined on Rule B.
3. Third Floor Rooms.
   Not less than 70% of basement pipe area as determined in Rule C.
4. Where one stack is used to convey heat to two rooms, its net area shall be determined by adding together the areas of the two single stacks, which would be required to take care of the heat losses for each room were single stacks used.
5. In obtaining glass surface use full casement opening. An outside door is figured as glass.
6. To obtain net outside wall multiply height by width and deduct the glass in all windows and outside doors. For all rooms with attic spaces immediately above full ceiling areas shall be taken into account, using Table A.
7. For rooms having unusual exposure, ordinarily north, northeast and northwest, add 15% to pipe area. For east and west exposure add 10%.
8. Use no warm air pipe less than 8 inches in diameter. If a basement warm air pipe figures greater area than any standard commercial size then the nearest commercial size shall be used, provided, however, that the total pipe area shall in no case be less than the total requirements according to Rules A, B and C.
9. It is understood in using the above values for determining basement warm air pipe areas, that these pipes should be run comparatively straight and that they should not be over 10 to 12 feet in length. Sharp turns and long pipes should have extra capacity.
10. The value of 800 (used in cubic contents) is for an estimated air change of one room volume per hour. If it is desired to provide for 1½ room volume use the figure 600. If for 2 rooms volume use the figure 400.

D. Transition Fittings and Stacks.

1. Transition from warm air pipes to stacks shall be made with a well designed elbow or boot and no stack shall be less than 70% of the area of the warm air pipe leading to it.
2. All first floor fittings and connections shall maintain a free area equal to the round basement pipes leading to them.

E. Method for Determining Size of Registers.

1. All registers shall have a free area at least equal to the area of the basement pipes leading to them.

F. Method for Determining Size of Furnace.

1. Add together the areas (expressed in square inches) necessary for heating the building, as determined by the foregoing *calculated* requirements, Section 4, Rules A, B and C, and install a furnace, rated by the following formula:

FURNACE RATING FORMULA

$L = 1.75\ G\ [1 + 0.2\ (R-20)]$.

L = square inches of warm air pipe connected to the furnace as calculated.

G = grate area in square inches; the area of the fire pot at the grate level; its most restricted area.

R = ratio of heating surface area to grate area; 1.75 = a constant based upon the results obtained on a furnace having 20 square feet of heating surface for each square foot of grate, and including factors for:

E = efficiency or heater;
C = combustion rate;
F = calorific value of fuel;
0.75 = percentage of heat available at registers.
136 = B.t.u. delivering value of one square inch of pipe, assuming half of the heat is sent to each floor. This value is based on an operating temperature of 175° F. at the register.

The formula allows 1.75 inches of warm air pipe area for each square inch of grate area, for the furnace having a ratio of heating surface to grate surface of 20 to 1. For furnaces having other ratios of heating surface to grate surface, it adds 2 per cent or deducts 2 per cent for each unit above or below a ratio of 20.

Application:

		No. 1 Positive Correction	No. 2 No Correction	No. 3 Negative Correction
Great area, sq. in.	=	346	346	346
Heating surface area sq. in	=	7540	6920	5665
Ratio heating surface area to grate area	=	21.8 to 1	20.0 to 1	16.4 to 1
R — 20	=	1.8	0.0	—3.6
Correction per cent	=	3.6	0.0	—7.2
1.75 G	=	606	606	606
L = 1.75 G plus Correction	=	628	606	562

2. In second floor duplex, flats or apartments where separate heating plants are used, add 50% to the total net calculated areas as determined in Section 4, C2. This represents the required warm air pipe capacity in square inches of the furnace for the second floor.

Section 5. Installation.

A. LOCATION OF FURNACE

The location of the furnace shall equalize the length of warm air runs as far as possible, yet give necessary preference to pipes supplying living rooms, dining rooms and main halls.

B. FOUNDATION

Furnace foundation of brick, cement or other incombustible material must be provided. Said foundation to extend at least fifteen inches (15") at rear and sides of furnace casing and at least thirty-six inches (36") in front of furnace casing. Foundation to be level. Where a furnace is to be placed on combustible material, the specifications of the National Board of Fire Underwriters shall be complied with.

C. SETTING OR ASSEMBLING OF FURNACE

(1) The base ring of the furnace shall be cemented to the foundation, making an air-tight joint. The furnace parts shall be assembled plumb and level, and in a workmanlike manner.

(2) All sections and joints shall be properly fitted. Joints requiring cement shall be well filled and all bolts shall be drawn up tightly.

(3) Every warm air furnace shall be equipped with a water pan or humidifying device to evaporate moisture in the air.

D. CASINGS

(1) Warm air furnaces shall be enclosed in metal casings or walls of brick, tile or concrete.

(2) Portable sheet metal casings, including casing tops, shall be made of galvanized sheets, not lighter than 26 U. S. Standard Gauge. They shall fit the casings and casing rings closely, so as to be dust-tight, and shall be securely fastened to the front. The casing shall be lined from the upper casing ring down to a line on a level with the grate.

(3) When side collars are used the casing top must be of sufficient height so that the largest warm air pipe can be taken from side without ovaling. In no case shall a distance less than eight inches (8") be maintained between the top of any furnace and the top line of the bonnet.

(4) Any furnace, the casing top of which shall come within twelve inches (12") of a combustible floor, ceiling or joist, shall be protected by a metal shield extending not less than eighteen inches (18") beyond the casing of said furnace. This shield shall be suspended at least two inches (2") below woodwork, allowing free air space between shield and woodwork. No furnace casing or top, coming nearer than six inches (6") of ceiling or joists shall be allowed in any case.

(5) Openings for side casing collars shall be cut into the casing top, so that the tops of all openings are on a level. Casing collars shall be fitted into place with a proper flange, or bead on the outside and drawn up on the inside, making a dust-tight joint. All collars shall be of same size as the warm air pipes to which they are to be connected.

(6) Brick, cement or hollow tile casing shall be constructed as follows: Walls shall be not less than eight inches (8") in thickness, and shall be constructed air tight. The least inside dimension of rectangular casing shall be the same as that of the portable casing of a corresponding size of furnace. Walls shall be carried to the same height as the portable walls, allowing not less than eight inches (8") between the top of the furnace and the bottom of the top cover. After placing the collars for the warm air pipes, continue the masonry up two inches (2") above the top of the collars, lay single or tee irons across the furnace top, spaced eight inches (8"), cover these with sheet metal not less than 26 U. S. Standard Gauge, cover the sheet metal with masonry or sand and run the side walls four inches (4") above the roof of the furnace. A galvanized iron casing bonnet may be used on a brick set furnace.

Provisions shall be made in the walls for a manhole to give egress to heater.

E. WARM AIR PIPES IN BASEMENT

(1) All warm air pipes shall be made of bright tin, not lighter than IC, or galvanized iron. All elbows shall be made of bright tin not lighter than IC, or galvanized iron, and shall be four-piece, 90 degree. Side seams shall be locked seams. All joints shall be either

double seamed or lapped not less than one and one-quarter inches (1¼") and such joints shall be match-beaded, or beaded and soldered, or riveted. All pipes and fittings shall be properly secured to ceiling or joist. No soldered or riveted joint is required where round pipe slips over the casing collar or enters boot or box. Any pipe fourteen inches (14") or greater in diameter shall not be made of material lighter than IX tin or No. 26 U. S. Standard Gauge galvanized iron.

(Note.—It is recommended that all warm air pipes in the basement shall have an upward pitch of not less than one inch (1") per running foot.)

(2) All warm air pipes in the basement shall be provided with dampers supported on both sides not more than two feet from the casing.

(3) Where warm air pipes pass through a masonry wall, a metal thimble shall be provided, having a diameter at least one inch (1") greater than the pipe, and the pipe supported in such a manner that the air space is uniform on all sides.

(4) All openings around first floor, wall and floor boxes and stacks to upper floors shall be sealed dust-tight.

F. WALL STACKS

(1) All wall stacks or wall pipes, heads, boots, ells, tees, angles and other connections shall be made of bright tin or galvanized iron, and shall be covered with not less than one thickness of 12-pound per 100 square foot of asbestos paper. All such pipes shall be braced in a proper manner so as not to obstruct the flow of air, but to retain the full capacity throughout. All joints shall be fastened securely and the stacks held in place by means of lugs, or straps.

(2) All warm air stacks shall be run in inside walls. Where it is absolutely necessary to run same in outside walls, they shall be insulated with mineral wool or not less than three (3) thicknesses of air cell asbestos paper.

G. REGISTERS

Section 4. (1) When baseboard or wall registers are used, they shall be attached to the stack head in such a manner that will prevent any leakage of air between the head and the register.

(2) Any furnace system having not more than two warm air registers, at least one of the registers shall be without valve or louvers and the pipe thereto shall be without damper.

H. AIR SUPPLY TO FURNACE

Section 5. (1) The air supply to furnace for warm air heating plants may be taken from outside or from within the building, or may be taken partially from outside and partially from within. In no case, however, shall air be supplied to any furnace from any basement or furnace room.

(2) The cold air intake or return where air is taken from within the building shall have a net area throughout its entire length of not less than the combined net area of all warm air pipes leading from the furnace. This may be maintained in one or more ducts. No reverse incline or air trap will be allowed in any section thereof.

(3) When the cold air supply is taken wholly from the outside of the building, the supply duct at its most contracted area must equal or exceed eighty per cent (80%) of the combined area of all warm air pipes leading from the furnace.

(4) Cold air ducts shall maintain a constant net area throughout their entire length and shall be made dust-tight. Horizontal return ducts shall have at least 10% greater area than vertical connecting pipes. Where a boot or shoe is connected to the casing at the base, the opening shall not extend higher than a line on the level of the grate of the furnace. The width of the shoe shall be of proper measurement to make the area at least equal to that of the round or square pipe to which it is connected.

(5) Wherever the space between joists is used to convey cold air overhead, such space shall be at least 10% greater in the area than the connecting pipe, and shall be sealed and air-tight.

(6) When it is necessary to set the furnace over a pit and connect up cold air under the basement floor, such pit or cold air trench shall not exceed eighteen inches (18") in depth below the casing ring, and the width of the trench or trenches shall be of proper measurement to make the area at least equal to the pipe to which it is connected. The connection between the cold air pipe or duct and the underground pit shall be made with converse transition joint.

(7) The cold air face or faces shall be made of wood or metal. When set in floors the top of wood faces shall be flush with floor. Where cold air face is placed in a seat or side wall the open work of face must extend to within one-quarter inch (¼") of the floor line.

(8) The free area of cold air faces shall be at least equal to the free area of the duct or ducts to which they are connected.

(9) The capacity of any vertical cold air face shall be determined by multiplying the base line in inches by not to exceed fourteen inches (14") in height and deducting for the grills or cross bars.

I. SMOKE PIPES

(1) The smoke pipe shall be as short and direct as consistent with the location of the furnace. It shall be made of metal not lighter than No. 24 U. S. Standard Gauge and not less than the full size of the collar on the furnace throughout its entire length. It must have no opening for attaching any fireplace, stove, range, water heater, gas or ventilating connection. It shall be lock seamed or riveted; all joints shall lap not less than one and one-half inches (1½") and it shall be rigidly secured. Cast iron smoke pipe may be used.

(2) All smoke pipes shall be provided with check dampers, placed on the side of the pipe or at the end of a tee; when cast iron smoke pipe dampers are used they must be placed between the check damper and the furnace, and supported on both sides of the pipe.

(3) Where the smoke pipe enters the flue, a thimble shall be cemented into the flue and the connections thereto made air-tight. Should any smoke pipe come within eighteen inches (18") of any combustible material, such combustible material must be covered with asbestos paper and a metal shield so fastened that a two-inch (2") air space exists between this shield and the combustible material. This shield shall be no less in size than twice the diameter of the smoke pipe and of sufficient length to cover the combustible material at all points.

(4) No smoke pipe shall project through any external wall or window.

J. PIPELESS OR ONE PIPE FURNACES

(1) When but one duplex grating is used for both warm air and cold air in a so-called pipeless furnace, the area of the cold air intake shall be at least equal to the area of the warm air outlet of the grating. Section 5, D, relative to casing, shall not govern when this type of furnace is installed, but the following specification shall be followed: The inner and outer casing of this type of furnace may be made of either black or galvanized iron not lighter than No. 26 U. S. Standard Gauge. A uniform air space shall be maintained at all points between the inner and outer casings. In no case shall the top of the heater be allowed closer than twelve inches (12") to any ceiling or joists above the furnace.

(2) Where joists are cut to accommodate this furnace, headers shall be put in and braced.

(3) Section 4, for determining area of warm air pipe, shall not govern in figuring a pipeless furnace.

(4) Where one warm air register face is used and separate face or faces for cold air supply are used, then Section No. 5 E, G and H shall apply.

K. PERMIT

(1) It shall be unlawful for any person, persons, firm or corporation to construct, replace or install any warm air heating furnaces or appurtenances thereto within the City of Chicago without first obtaining from the Commissioner of Buildings a permit to do such work, for which said person, persons, firm or corporation shall pay to said Commissioner of Buildings for the use of said city, for each furnace installed, renewed or repaired, the sum of five dollars ($5.00).

(2) No heating permits shall be required for minor repair work. By minor repair work is meant the incidental repairs to furnaces, which shall not affect the general action of the system, such as renewal of grates, smoke pipes and resetting old furnace in same location, or renewing of single warm air pipes in basement; but when additional runs or new stacks are installed, a permit shall be required, for which the person, firm or corporation installing said additional runs or new stacks shall pay to the Commissioner of Buildings, for the use of said city, the sum of one dollar ($1.00) for each outlet.

L. INSPECTION

Section 6. (1) It shall be the duty of the Commissioner of Buildings to cause an inspection to be made of all warm air furnaces and the appurtenances thereto hereafter installed by an inspector who is an experienced and competent journeyman sheet metal worker, and see that same is installed or constructed in conformity to the provisions of this ordinance. The expenses of such inspection shall be paid out of the fees received for permits to install or construct such warm air furnaces and appurtenances.

(2) Inspection of new work in new buildings shall be made as follows: When such work has proceeded to where the stacks to upper floors and heads for all side wall registers have been installed, boots connected thereto, the contractor or person obtaining permit for this work shall notify the Commissioner of Buildings, who shall make or cause to be made an inspection of such work. Upon finding that the work complies in all respects with the terms of this ordinance, there shall be affixed by said Commissioner of Buildings, or his representative, to each register head a certificate stating that the work complies with the ordinance relating thereto.

(3) Inspection of new work in buildings already constructed shall be made only after installation is completed.

(4) Final inspection of plant shall be made after the whole is connected up and ready to operate.

(5) It shall be unlawful for any person to lath over, plaster or cover up any warm air heating work in new buildings or completed buildings where plaster and lath have been removed before such work has been inspected and certificates above referred to have been attached.

Building Sign Used by Agricola Furnace Installers

The Commissioner of Buildings shall have the right and authority to remove or order removed all such lath, plaster or other coverings which may have been placed over such work before same has been inspected. The person, persons, firm or corporation ordering or causing such work to be covered up, or in any way violating any section of this ordinance as herein set forth, shall, upon conviction, be subject to the penalties set forth for violation of the terms of this chapter.

Section 6. Registration.

It shall be, unlawful for any person, firm or corporation to engage in the business of installing gravity warm air heating plants with necessary appurtenances thereto as heretofore defined without being registered as a warm air furnace heating and installing contractor in the manner hereinafter set forth; provided, however, that if such person, firm or corporation is already registered for the current year in another city or village within the State of Illinois, such contractor shall not be required to be registered or to pay a registration fee in this city.

Section 7. Application for Registration.

Any person, firm or corporation desiring to engage in the business of warm air furnace heating and installing contractor shall apply for registration to the Commissioner of Buildings. Upon the filing of such application in proper form and the payment of registration fee fixed herein, the Commissioner of Buildings shall register the applicant as a warm air furnace heating and installing contractor, and shall issue to the applicant a Certificate of Registration which will authorize the applicant to engage in such business for the year in which it is issued; providing, that such applicant has filed with the City Collector an indemnifying bond as hereinafter set forth. The Commissioner of Buildings shall keep a suitable record of such registration.

Section 8. Bond.

Prior to the issuance of a certificate of registration for warm air furnace heating and installing contractor, the applicant shall file with the City Clerk of the City of Chicago an indemnifying bond with good and sufficient sureties in the penal sum of ten thousand dollars ($10,000), such bond being payable to the City of Chicago, for the use of any persons, firms or corporations with whom such applicant shall thereafter contract to do work, to indemnify any such persons, firms or corporations for damages sustained on account of the failure of such applicant to perform the work so contracted for, in accordance with the provisions and requirements of the City of Chicago relating to the installation of gravity warm air heating plants with necessary appurtenances thereto.

Section 9. Fee for Registration. Term.

The fee for registration as a warm air furnace heating and installing contractor shall be fifty dollars ($50.00) per annum, which shall be paid by the applicant to the City Collector in advance upon filing his application. The certificate of registration issued thereunder shall expire on the 31st day of December of the year in which it is issued.

Section 10. Validity.

Should any section or provision of this ordinance be held unconstitutional or invalid by any court, all other sections and provisions shall nevertheless be deemed as effective as though such unconstitutional or invalid section or provisions had never been inserted in this ordinance.

Section 11.

All ordinances, or parts of ordinances, inconsistent with the provisions of this ordinance are hereby repealed.

Section 12. Penalty.

Any person, firm or corporation that shall engage in the business of a warm air heating and installing contractor without obtaining a certificate of registration as herein provided for, or that shall violate any of the provisions of this ordinance, shall be fined not less than fifty dollars ($50.00) nor more than two hundred dollars ($200.00) for each offense, and a separate and distinct offense shall be regarded as committed every day on which such person, firm or corporation shall continue to operate contrary to the provisions of this ordinance.

Section 13.

This ordinance, including the provisions and penalty therein set forth, shall this effect and be in force from and after its passage and due publication.

Furnace Signs Follow Others in Keeping with Times

The warm air heating industry in general and the local warm air heating associations in particular are working to the end that they can evolve methods of getting warm air

Window or Counter Sign

heating before the public. In an effort to take advantage of an excellent opportunity to keep warm air before the public that is offered on the sides of buildings in which such equipment is being installed many furnace men have designed signs telling the public that a certain product is being installed.

The Greater Chicago Warm Air Heating Association is at the present time working out a sign that will emphasize the merits of "Modern Heat Installed for Economy, Health and Efficiency." In the very near future this sign will be perfected and will be sold to members of the association at cost.

Furnace manufacturers, too, have been making efforts to develop signs of this character and the latest of these coming to our attention are those of the Agricola Furnace Company, Gadsden, Alabama. One is a building sign and the other is a sign that can be stood in the window or on the counter of the show room.

Wisconsin Sheet Metal Men to Picnic August 8

The Master Sheet Metal Contractors' Association of Milwaukee, was held July 11, 1928.

President Reinke was in the chair and nine members were present.

The picnic committee reported that arrangements have been made to have the picnic at Knepels Grove, Mequon, Wisconsin, August 8.

R. Jeske reported on the minimum wage law, stating that no action had been taken up to date and nothing definite could be reported.

It was recommended that the August meeting he dispensed with unless something special comes up for action.

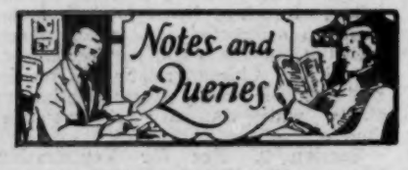
Mrs. H. O. McElwain Dies Suddenly at Elkhart, Indiana

The sympathy of the entire warm air heating industry goes out to H. O. McElwain, Lennox Furnace Company representative in Indiana, in his hour of bereavement. His wife, Margaret, died at Elkhart, Indiana, Friday, July 13, 1928.

Mrs. McElwain was a familiar figure at the convention of the National Association of Sheet Metal Contractors and the conventions of the Indiana Sheet Metal and Warm Air Heating Association. She was greatly missed at the Cleveland convention this year. She had an enjoyable personality and easily won the friendship of those with whom she came in contact. Her passing is a great loss to her friends.

C. M. Hughes Goes With Warm Air Furnace Fan Company

Robert O. Brannan of the Chicago branch Warm Air Furnace Fan Company announces that C. M. Hughes has become associated with that company in the Chicago branch. Mr. Hughes is a graduate engineer and is familiar with the sheet metal trade by reason of his former connection with the New Jersey Zinc Sales Company.



Minwool Insulation

From International Oil Burner Company, Watertown, New York.

Can you tell us who makes Minwool Insulation?

Ans.—The Minwool Company, Kalamazoo, Michigan.

Franklin Stove

From Wendel Furnace and Sheet Metal Works, 246 First Street, Hinsdale, Illinois.

Who in Chicago handles the Franklin Stove, which is used to place in front of a fireplace?

Ans.—W. D. Sager, 330 E. North Water Street.

Who Makes Safe-T-Hot Attachment for Regulating Hot Water Gas Heaters?

To AMERICAN ARTISAN:

Can you tell us who makes Safe-T-Hot attachment for regulating hot water gas heaters?

Very truly yours,

INTERNATIONAL OIL BURNER CO.

Watertown, New York,

July 16, 1928.

SPOT NEWS

The W. R. Ames Co. has moved its sheet metal works from 450 Irwin street to 150 Hooper street, San Francisco, Cal.

The Western Metal Products Co., manufacturers of sheet metal work of all kinds, San Francisco, Cal., has moved from 367 Ninth street to 1160 Bryant street, where it has six times the space.

The A. B. Blomquist Co., Superior, Wis., dealer in furnaces, garage heaters, garbage incinerators, etc., has moved to much larger quarters at 1711 Belknap street.

H. A. Fritz, 927 West Broadway, has the warm air heating contract for two bungalows of Hildebrand Brothers, in Minneapolis, Minn.

The Flour City Furnace Co., 1717 East Lake street, Minneapolis, Minn., has the warm air heating contract for R. C. Soens bungalow at 4501 16th avenue S.

R. Claussen, 617 West Second street, Davenport, Iowa, has the warm air heating contract for residence of Mrs. Y. Timmerman.

The Farmersburg Hardware Co., Inc., Farmersburg, Iowa, has been chartered, with a capital of $15,000, and will have a warm air heating department. Edward Johnson is president, and Francis Hart is secretary.

The Union Sheet Metal Works, 1211 East Douglas, Wichita, Kas., has the sheet metal contract for new building of Fred Dold Packing Co.

The Guilfoy Cornice Works, 1234 Howard street, San Francisco, Cal., has the sheet metal work contract on addition to Jefferson school in that city. This company also has been awarded the sheet metal contract on $50,000 Market Building at Burlingame, Cal.

The Blattman-Weeser Sheet Metal Works, Inc., 1001 Toulouse street, New Orleans, La., has $24,100 contract for roofing the Poydras and Girod street wharves.

The Oklahoma Boiler & Sheet Metal Works has been incorporated in Picher, Okla., with a capital stock of $150,000, by John E. Landis of Picher and H. F. Minnick of Miami.

"This Letter Tells

Why I Regard Steel as Best"

"THE other day I got a letter from one of our old customers saying he was thinking about reroofing his house and putting on new eavestroughs and downspouts. He wanted to know which sheet metal I thought would be best for the job, everything considered.

"So I've written him this letter and told him that I regard sheet steel as the best thing for him to use. I've given him some comparisons here that are interesting. They show that because of the lower first cost of sheet steel, the moderate cost for occasional painting, when added to it, still leaves a lower total service cost than is possible with any other kind of sheet metal. I've told him that a good 24 or 26 gauge, heavy galvanized sheet steel roof, kept painted, will last him as long as his house, and, of course, that's all he wants."

Sheet metal contractors can always recommend sheet steel of adequate gauge for exposed surfaces with full assurance that it will give complete satisfaction at moderate cost. SHEET STEEL TRADE EXTENSION COMMITTEE, TERMINAL TOWER BLDG., CLEVELAND, O.

SHEET STEEL

for Strength Safety Beauty and Economy

Steel Producers Drive to Stabilize Prices

Firm Prices and Ask More for Future Commitments
Sheet Mills Continue Active—Non-Ferrous Metals Quiet

LACKING little on the score of tonnage for mid-July, producers of iron and steel are endeavoring to get the price situation in hand. Either they are resisting further declines or serving notice they will ask more when present commitments have been worked off. There are signs that the market is scraping the bottom of the present downward movement.

Have Opportunity to Apply Advances

The effort at stabilization of domestic prices, following a righting of the export price situation, comes at a time when the mills have comparatively little forward tonnage on their books. If their determination holds, they will be able to apply advances on the bulk of the tonnage normally accruing to them through the fall pickup in general business. It is recognized within the industry that the obstacle to overcome is not pressure from consumers but inclination of producers to elicit orders by concessions.

Incoming business, which seasonally high operating rates translate promptly into shipments, continues on a slightly higher level than a year ago. Automotive demand for steel is about stationary, new models and a slowly-expanding Ford rate about neutralizing recessions by some makers.

Steel corporation subsidiaries are operating this week at 73 per cent, compared with 75 per cent last week and 69 per cent a year ago. The entire industry average 70 per cent.

Heavy finished steel is strongest in the East, where an increasing proportion of orders is being booked at 1.90c, Pittsburgh. A majority of tonnage in the Pittsburgh district is being invoiced at 1.85c, with small users paying 1.90c. In many cases mills are obtaining $1 per ton more than earlier this year.

Hot weather impedes sheet mill operations in the Pittsburgh and Youngstown districts. All classes of consumers are buying well and some Youngstown mills are scheduled at capacity well into August. Shipments of the American Sheet & Tin Plate Co. in the first half set a record. Less can still be done, but the most general quotations are 2.00c, Pittsburgh, on blue annealed, 2.65c on black and 3.50c on galvanized. June sales by independent mills totaled 318,902 tons, against only 250,316 tons in May, while June shipments were 308,741 tons compared with 326,324 tons in May. Tin plate mills continue to operate at 90 per cent or better.

Pig Iron

Pig iron sellers are endeaviring to maintain $16.75, valley, as minimum on No. 2 plain, but are losing in one or two directions due to recurrence of a $16.50 price. General interest in the market is limited to small scale. Inquiries are scarcer than in many weeks. Bessemer tonnage is on the increase, one or more consumers closing up third quarter contracts at $17, valley, one involving 750 tons. Demand for basic is quiet. Most producers are maintaining a quotation of $16, valley.

Sales of northern pig iron at Chicago are on a lower level due more to the closing of some melters' plants for midseason inventories than to lack of interest. The reduction in price to $17.50 base, a week ago, following a reduction to $18 on May 15 failed to stimulate spot buying, but several large users have closed for third quarter and last half.

Birmingham furnace interests have felt a slight improvement in demand in the last few days. Melters intimate that same price base, $15.50, will continue through the remainder of the year.

Copper

Some buying of August domestic shipment was done lately and export buying also picked up, but in the past few days the market has been quiet again. Meanwhile specifications are taking copper as rapidly as refineries can turn it out. Prices are firm and unchanged on the basis of 14.75c, Connecticut. Output and shipments in June were the largest ever made by the industry in any month.

Zinc

Prime western zinc has sold in a light way for early shipment. Back of the market is a firm ore market at $40 a ton. Smelters also are cooperating better than ever before.

Tin

The price has held unusually steady though business the past week has been light. In the previous week the buying had been large. This feature of steadiness in a quiet period is different from the way the market has been acting the past few months but it may have some relation to the fact that the market has had a big shaking down and could not be expected to continue to fall without some interruptions.

Lead

Business has been a little more active but not large. Domestic shipments are running a little behind last year.

Solder

Chicago warehouse prices on solder are as follows: Warranted 50-50, $30.50; Commercial 45-55, $27.50; plumbers', $24.50, all per 100 pounds.

Old Metals

Wholesale quotations in the Chicago district, which should be considered as nominal, are as follows: Old steel axles, $15.75 to $16.25; old iron axles, $23.50 to $24.00; steel springs, $15.50 to $16.00; No. 1 wrought iron, $11.00 to $11.50; No. 1 cast, $12.75 to $13.25; al per net tons. Prices on non-ferrous metals are quoted as follows, per pound: Light copper, 10½ cents; zinc, 3½ cents; cast aluminum, 12¼ cents.

Inland Copper Alloy Steel Sheets

U. S. Government Dirigible Hangar at Grosse Ile, near Detroit, Michigan, completely covered with Inland Copper Alloy Galvanized Sheet Steel.

The Verdict *of the* Elements

Twelve years ago, the American Society for Testing Materials, an unbiased scientific and technical organization, placed a variety of unprotected black sheets in racks at Pittsburgh, Pa., Fort Sheridan, Ill., and Annapolis, Md., to determine which of the various materials exposed, best withstood rust and corrosion.

The verdict was *Copper Alloy Steel Sheets*. They far outlasted all other steel and iron sheets in resisting the onslaught of the elements. No other grade was comparable.

This is why we so strongly recommend INLAND COPPER ALLOY STEEL for all exposed uses. It can be furnished in Blue Annealed, Box Annealed and Galvanized Sheets.

INLAND STEEL COMPANY

38 South Dearborn Street
CHICAGO

Branch Offices: ST. LOUIS MILWAUKEE ST. PAUL KANSAS CITY

Contributing Member: SHEET STEEL TRADE EXTENSION COMMITTEE

Sheets · Bars · Plates · Shapes · Rails · Track Accessories · Rivets · Billets

When writing mention AMERICAN ARTISAN—Thank you!

Chicago Warehouse Metal and Furnace Supply Prices

AMERICAN ARTISAN is the only publication containing Western Metal, Furnace Supply and Hardware prices corrected weekly

METALS

PIG IRON

Chicago Fdy., No. 2	$17.50
Southern Fdy. No. 2	21 51
Lake Superior Charcoal	27 04
Malleable	17.50

FIRST QUALITY BRIGHT TIN PLATES

1C	20x28 112 sheets	$25 10
IX	20x28	29 60
IXX	20x28 56 sheets	16 20
IXXX	20x28	17 55
IXXXX	20x28	18 95

TERNE PLATES

		Per Box
IC	20x28, 40-lb. 112 sheets	$25 00
IX	20x28, 40-lb. 112 sheets	27 75
IC	20x28, 25-lb. 112 sheets	21 15
IX	20x28, 25-lb. 112 sheets	23 80
IC	20x28, 20-lb. 112 sheets	19 55
IV	20x28, 20-lb. 112 sheets	22 05
IC	20x28, 15-lb. 112 sheets	18 05

"ARMCO" INGOT IRON PLATES

No. 8 ga. up to and including ¼ in.—100 lbs. $4 55

COKE PLATES

Cokes, 80 lbs., base, 20x28	$13 60
Cokes, 90 lbs., base, 20x28	13 30
Cokes, 100 lbs., base, 20x28	14 00
Cokes, 107 lbs., base, IC 20x28	14 30
Cokes, 135 lbs., base, IX 20x28	16 40
Cokes, 155 lbs., base, 56 sheets	9 30
Cokes, 175 lbs., base, 56 sheets	10 05
Cokes, 195 lbs., base, 56 sheets	10 90

BLUE ANNEALED SHEETS

Base 10 ga. per 100 lbs.	$3 35
"Armco" 10 ga. per 100 lbs.	4 00

ONE PASS COLD ROLLED BLACK

No. 18-20 per 100 lbs.	$3 75
No. 22 per 100 lbs.	3 90
No. 24 per 100 lbs.	3 80
No. 25 per 100 lbs.	4 00
No. 27 per 100 lbs.	4 10
No. 28 per 100 lbs.	4 20
No. 29 per 100 lbs.	4 35
No. 30 per 100 lbs.	4 45

"ARMCO" GALVANIZED

"Armco" 24 per 100 lbs. $6 00

GALVANIZED

No. 16 per 100 lbs.	$4 20
No. 18 per 100 lbs.	4 45
No. 20 per 100 lbs.	4 60
No. 22 per 100 lbs.	4 65
No. 24 per 100 lbs.	4 65
No. 25 per 100 lbs.	5 00
No. 27 per 100 lbs.	5 15
No. 28 per 100 lbs.	5 30
No. 30 per 100 lbs.	5 70

BAR SOLDER

Warranted
50-50 ..... per 100 lbs. $30 50

Commercial
45-55 ..... per 100 lbs. 27 50
Plumbers ... per 100 lbs. 24 50

ZINC

In Slabs ..... $ 8 50

SHEET ZINC

Cask Lots (600 lbs.)	$10 75
Sheet Lots	11 75

BRASS

Sheets, Chicago Base	19¼c
Mill base	18½c
Tubing, brazed base	27¼c
Wire, base	18¾c
Rods, base	16¼c

COPPER

Sheets, Chicago base	24¼c
Mill base	23½c
Tubing, seamless base	26¼c
Wire, No. 9, B & S Ga.	19¾c
Wire, No. 10, B & S ga.	19½c
Wire, No. 11, B & S Ga.	20¼c
Wire, No. 3, B & S Ga. and heavier	19c

LEAD

American Pig	$7 20
Bar	8 20

TIN

Pig Tin per 100 lbs.	$55 00
Bar Tin per 100 lbs.	56 00

HARDWARE, SHEET METAL SUPPLIES, WARM AIR FURNACE FITTINGS AND ACCESSORIES.

ASBESTOS

Paper up to 1/16	6c per lb.
Roll board	6¼c per lb.
Mill board 2/32 to ½	6c per lb.
Corrugated Paper (250 sq. ft. to roll)	$6 00 per roll

BRUSHES

Furnace Pipe Cleaning
Bristle, with handle, each $0 75

Flue Cleaning
Steel only, each 1 35

BURRS

Copper Burrs only 40-2½%

CEMENT, FURNACE

American Seal, 5-lb. cans, net	$ 45
American Seal, 10-lb. cans, net	85
American Seal, 25-lb. cans, net	2 25
Pecora ..... per 100 lbs.	7 50

CHIMNEY TOPS

Adams' Revolving	Wt. Doz.	Price Doz.
4 in.	21 lbs.	$11 00
6 in.	24 lbs.	11 50
7 in.	30 lbs.	13 50
8 in.	33 lbs.	15 00
9 in.	51 lbs.	16 50
10 in.	56 lbs.	18 00
12 in.	66 lbs.	22 00
14 in.	110 lbs.	36 00

CLINKER TONGS

Each $1 50

CLIPS

Damper
No-Rivet Steel, with tail pieces, per gross $9 50
Rivet Steel, with tail pieces, per gross 7 50
Tail pieces, per gross 2 40

COPPERS—Soldering

Pointed Roofing

3 lb. and heavier per lb.	40c
2½ lb. per lb.	45c
2 lb. per lb.	48c
1½ lb. per lb.	55c
1 lb. per lb.	60c

CORNICE BRAKES

Chicago Steel Bending
Nos. 1 to 6B ..... Net

CUT-OFFS

Gal., plain, round or cor. rd.
26 gauge 30%
28 gauge 35%

DAMPERS

"Yankee" Hot Air

7 inch, each 20c, doz.	$1 60
8 inch, each 25c, doz.	2 20
9 inch, each 30c, doz.	2 60
10 inch, each 32c, doz.	2 80

Smoke Pipe

7 inch, doz.	$1 60
8 inch, doz.	2 20
9 inch, doz.	2 60
10 inch, doz.	3 75
12 inch, doz.	4 50

ADAMS No. 1 CHECK

Check and Collar Complete

8 inch, each	2 00
9 inch, each	2 25

End Check Only

8 inch, each	1 60
9 inch, each	1 85

Collar Only

8 inch, each	50
9 inch, each	65

No. 2 CHECK

8 inch, each	1 00
9 inch, each	1 00

10% Disc. on Adams No. 1 and No. 2 Check

Diamond Smoke Pipe

7 inch, doz.	$ 2 00
8 inch, doz.	3 20
9 inch, doz.	4 80
10 inch, doz.	6 00

Adams' Sheet Metal

7 inch, doz.	$ 1 60
8 inch, doz.	2 20
9 inch, doz.	2 60
10 inch, doz.	2 80
12 inch, doz.	3 50
14 inch, doz.	5 00

EAVES TROUGH

Galv. Crimpedge, crated 75 & 5%
Zinc, "Barnes" 60%

ELBOWS

Conductor Pipe

Galv. plain or corrugated, round flat Crimp.

28 Gauge	60%
26 Gauge	45%
24 Gauge	15%

Galv. & Terne Steel

Plain Rd. and Rd. Corr.:

28 Ga.	60%
26 Ga.	45%
24 Ga.	15%

Square Corrugated

No. 28 Gauge	50%
26 Gauge	35%

Portico Elbows

Standard Gauge Conductor Pipe, plain or corrugated.

Not nested	70 & 5%
Nested Solid	70 & 5%

Sq. Corr., A. & B. & Octagon

28 Ga.	50%
26 Ga.	35%

Portico

1", 1¼", 1½" 45%

Copper

16 oz., all designs 50%

Zinc—

All styles 60%

ELBOWS—Stove Pipe

1-piece Corrugated. Uniform Blue "Milcor" No. 28 Gauge.	Doz.
5-inch	$1 05
6-inch	1 20
7-inch	1 75

Special Corrugated

6-inch	$1 00
7-inch	1 60

Adjustable—Uniform Blue "Milcor" No. 28 Gauge. Uniform Blue.

5-inch	$1 65
6-inch	1 75
7-inch	2 10

WOOD FACES—50% off list.

FENCE

726-6-12½% (100 rods)	$28 68
1948-6-14½% (100 rods)	43 62

FILES AND RASPS

Heller's (American)	50-10%
American	60-10%
Arcade	50%
Black Diamond	50%
Eagle	50%
Great Western	50%
Kearney & Foot	50%
McClellan	50%
Nicholson	50%
Simonds	60%

FIRE POTS

Geo. W. Diener Mfg. Co.	Ea.
No. 02 Gasoline Torch, 1 qt.	$ 5 13
No. 0250, Kerosene, or Gasoline Torch, 1 qt.	6 50
No. 10 Tinner's Furn. Square tank, 1 gal.	11 30
No. 15 Tinner's Furn. Round tank, 1 gal.	10 70
No. 21 Gas Soldering Furnace	8.60
No. 110 Automatic Gas Soldering Furnace	10 50

Quick Meal Stove Co.
Vesuvius, F. O. B. St. Louis 30%
(Extra Disct. for large quantities.)

GALVANIZED WARE

Pails (Galv. afte made), 10-qt.	$2 00
Tubs (Galv. after made).	
No. 1	5 75
No. 2	6 50

GLASS

Single Strength, A, 52-in. brackets	55%
Single Strength, B, 34 to 40-in. brackets	39-5%
Single Strength, A, all other brackets	55%
Double Strength, A, all sizes	55%

HANGERS

Conductor Pipe
Milcor Perfection Wire 25%
Milcor Triplex Wire 10%

Eaves Trough
Milcor Steel (galv. after forming) List .... plus 12½%
Milcor Sellock E. T. Wire, List ..... plus 50%

HOOKS

Conductor
"Direct Drive" Wrought Iron for wood or brick .. 15%

HUMIDIFIER

"Front-Rank," Automatic
In single lots 50%
In lots of 10 or more 50-5%
In lots of 25 or more ... 50-10%
Vapor pans, etc., each 50%

LIFTERS

Stove Cover
Coppered ..... per gro. $6 00
Alaska ..... per gro. 4 75

MALLETS

Tinners
Hickory ..... per doz. $2 25

MITRES

Galvanized steel mitres,
28 Ga. 70
26 Ga. 60-20

NAILS

Cut Steel	$4 35
Cut Iron	4 25

Wire
Common $3 10
Cement Coated 3 10

(Continued on Page 118)

ADVERTISERS' INDEX

The dash (—) indicates that the advertisement runs on a regular schedule but does not appear in this issue.

Markets—Continued from Page 116

NETTING, POULTRY

Galvanized before weaving 60%
Galvanized after weaving. 50-10%

PASTE

Asbestos Dry Paste:

200-lb. Barrel	$16 00
100-lb. barrel	8 75
25-lb. pail	3 50
10-lb. bag	1 10
5-lb. bag	60
2½-lb. cartons	35

POKERS, FURNACE

Each $0 75

POKERS, STOVE

Nickel Plated, coil handles, per doz.	1 10
W'r't Steel, str't or bent, per doz.	$0 75

PIPE

Conductor
Cor. Rd., Plain Rd., or Sq.

Galvanized
Crated and nested (all gauges) 75-2½%
Crated and not nested (all gauges) 70-15%

Furnace Pipe
Double Wall Pipe and Fittings 50%
Single Wall Pipe, Round Galvanized Pipe 50%
Galvanized and Tin Fittings 50%

Lead
Per 100 lbs. $12 50

Stove Pipe
"Milcor" "Titelock" Uniform Blue Stove

28 gauge, 5 inch U. C. nested	10 50
28 gauge, 6 inch U. C. nested	11 00
28 gauge, 7 inch U. C. nested	12 00
30 gauge, 5 inch U. C. nested	9 00
30 gauge, 6 inch U. C. nested	10 00
30 gauge, 7 inch U. C. nested	12 00

T-Joint Made up
6-inch, 28 ga....per doz. $ 4 00

All Zinc
No. 11, all styles..... 60%

PULLEYS

Furnace Tackle....per doz. $0 25
.....per gro. 2 50
Furnace Screw (enameled)
.....per doz. 75

PUTTY

Commercial Putty, 100-lb. Kits $3 50

QUADRANTS

Malleable Iron Damper..... 10%

REDUCERS—Oval Stove Pipe

	Per Doz.
7—6, 28-gauge, 1 doz. in carton	$2 00

REGISTERS AND BORDERS

Baseboard, Floor and Wall.

Cast Iron 20%
Steel and Semi-Steel..... 40%
Baseboard, 1 piece.....40-20%
Baseboard, 2 piece..... 40%
Wall 40%
Adjustable Ceiling Ventilators 40%

Register Faces—Cast and Steel

Japanned, Bronzed and Plated, 4x8 to 14x14..... 40%
Large Register Faces—Cast, 14x14 to 22x42..... 55%
Large Register Faces—Steel, 14x14 to 22x42..... 65%

Ventilating Register

Per gross	$ 90
Small, per pair	30
Large, per pair	50

RIDGE ROLL

Galv., Plain Ridge Roll, b'dld 75-10-5%
Galv., Plain Ridge Roll crated 75-10%
Globe Finials for Ridge Roll..50%

SCREWS

Sheet Metal

7, ⅛x⅛, per gross.....	$0 52
No. 10, ⅜x3/16, per gross	61
No. 14, ⅜x¼, per gross..	83

SHEARS, TINNERS' & MACHINISTS'

Viking $22 00

Lennox Throatless
No. 18 ..... 35%
Shear blades 10%
(f. o. b. Marshalltown, Iowa)

SHIELDS, REGISTER

No. 1 "Gem" floor.....$12 00 doz.
No. 2 "Gem" wall..... 6 00 doz.

SHOES

Galv. 28 Gauge, Plain or corrugated round flat crimp...60%
26 gauge round flat crimp....45%
24 gauge round flat crimp....15%

SNIPS, TINNERS

Clover Leaf .....40 & 10%
National .....40 & 10%
Star 50%
Milcor .....Net

SQUARES

Steel and Iron .....Net
(Add for bluing $3 per doz. net)
Mitre .....Net
Try .....Net
Try and Bevel.....Net
Try and Mitre.....Net
Fox's .....per doz. $6 00
Winterbottom's 10%

STOPPERS, FLUE

Common .....per doz. $1 10
Gem, No. 1.....per doz. 1 10
Gem, flat, No. 2....per doz. 1 00

VENTILATORS

Standard .....30 to 40%

WIRE

Plain annealed wire, No. 6 per 100 lbs. $3 05
Galvanized barb wire, per 100 lbs. 3 90
Wire Cloth—black painted, 12-mesh, per 100 sq. ft.... 1 35
Cattle Wire—galvanized catch weight spool, per 100 lbs.. 3 80
Galvanized Hog Wire, 80 rod spool, per spool 3 10
Galvanized Plain Wire, No. 9, per 100 lbs. 3 85
Stove Pipe, per stone..... 1 10

WRINGERS

No. 790, Guarantee ...each	$5 10
No. 770, Bicycle .....each	4 70
No. 670, Domestic ....each	4 35
No. 110, Brighton ....each	3 70
No. 750, Guarantee ...each	5 10
No. 740, Bilcycle .....each	4 70
No. 22, Pioneer. .....each	3 40
No. 2, Superb .....each	3 65

BUYERS' DIRECTORY

Asbestos—Liquid.
B. & F. Mfg. Co., Des Moines, Ia.

Acetylene (Gas) Dissolved.
Prest-O-Lite Co., Inc., New York, N. Y.

Air Filters.
Sturtevant Co., B. F., Boston, Mass.

Bale Ties.
American Steel & Wire Co., Chicago, Ill.

Bolts—Stove.
The Kirk-Latty Co., Cleveland, Ohio
Lamson & Sessions Co., Cleveland, Ohio
Ryerson & Son, Inc., Jos. T., Chicago, Ill.

Brakes—Bending.
Dreis & Krump Mfg. Co., Chicago, Ill.
Ryerson & Son, Inc., Jos. T., Chicago, Ill.

Brakes—Cornice.
Dreis & Krump Mfg. Co., Chicago, Ill.

Brass and Copper.
American Brass Co., Waterbury, Conn.
Copper & Brass Research Association, New York

Burners—Gas.
Wender-Werker Gas Appliance Co., Cincinnati, Ohio

Cans—Garbage.
Osborn Co., The J. M. & L. A., Cleveland, Ohio

Castings—Malleable.
Fanner Mfg. Co., Cleveland, Ohio

Ceilings—Metal.
Burton Co., The W. J., Detroit, Mich.
Friedley-Voshardt Co., Chicago, Ill.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
Wheeling Corrugating Co., Wheeling, W. Va.

Chaplets.
Fanner Mfg. Co., Cleveland, Ohio

Chimney Tops.
Standard Ventilator Co., Lewisburg, Pa.

Clinker Tongs.
L. J. Mueller Furnace Co., Milwaukee, Wis.
Stover Mfg. & Engine Co., Freeport, Ill.

Copper.
American Brass Co., Waterbury, Conn.
Copper & Brass Research Association, New York

Cornices.
Friedley-Voshardt Co., Chicago, Ill.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City

Cutting Blowpipes
Oxweld Acetylene Co., New York, N. Y.

Cut-offs—Rain Water
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City

Dampers—Quadrants—Accessories.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
L. J. Mueller Furnace Co., Milwaukee, Wis.
Parker-Kalon Corp., New York, N. Y.
Stover Mfg. & Engine Co., Freeport, Ill.

Damper Regulators.
National Regular Co., Chicago, Ill.

Dies—Punch & Press.
La Salle Machine Works, Chicago, Ill.

Diffuser—Air Duct.
Aeolus-Dickinson Co., Chicago, Ill.
L. J. Mueller Furnace Co., Milwaukee, Wis.

Doors—Metal.
Lupton's Sons Co., David, Philadelphia, Pa.

Drive Screws—Hardened Metallic
Parker-Kalon Corp., 200 Varick St., New York

Eaves Trough.
Barnes Metal Products Co., Chicago, Ill

Berger Bros. Co., Philadelphia, Pa.
Berger Co., L. D., Philadelphia, Pa.
Burton Co., The W. J., Detroit, Mich.
Lupton's Sons Co., David, Philadelphia, Pa.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
New Jersey Zinc Sales Co., The New York, N. Y.
Wheeling Corrugating Co., Wheeling, W. Va.

Elbows and Shoes—Conductor.
Barnes Metal Products Co., Chicago, Ill.
Dieckmann Co., Ferdinand, Cincinnati, Ohio
Lupton's Sons Co., David, Philadelphia, Pa.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City

Feed Faces—Cold Air.
Auer Register Co., Cleveland, Ohio
American Wood Register Co., Plymouth, Ind.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City

Fences.
American Steel & Wire Co., Chicago, Ill.

Fittings—Conductor.
Barnes Metal Products Co., Chicago, Ill.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City

Flanges.
Chicago Metal Mfg. Co., Chicago, Ill.

Fittings—Steel Pipe.
Chicago Metal Mfg. Co., Chicago, Ill.

Flue Thimbles.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City

Furnace Cement—Asbestos.
Connors Paint Mfg. Co., Wm., Troy, N. Y.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City

Furnace Cement—Liquid.
Technical Products Co., Pittsburgh, Pa.

Furnace Cleaners—Suction.
Brillion Furnace Co., Brillion, Wis.
Sturtevant Co., B. F., Boston, Mass.

Furnace Coloring (Enamel).
B & F Mfg. Co., Des Moines, Iowa

Furnace Fans.
A. H. Robinson Co., Massillon, Ohio
Warm Air Furnace Fan Co., The Cleveland, Ohio

Furnace Fuse.
National Regulator Co., Chicago, Ill.

Furnace Regulators.
National Regulator Co., Chicago, Ill.

Furnace Rings.
Forest City-Walworth Run Foundries Co., Cleveland, O.
Milwaukee Corrugating Co., Milwaukee, Wis.

Furnaces—Gas.
Mueller Furnace Co., L. J., Milwaukee, Wis.

Furnaces—Warm Air.
Agricola Furnace Co., Gadsden, Ala.
American Furnace Co., St. Louis, Mo.
American Foundry & Furnace Co., Bloomington, Ill.
Brillion Furnace Co., Brillion, Wis.
Floral City Heater Co., Monroe, Mich.
Forest City-Walworth Run Fdy. Co., Cleveland, Ohio
Fox Furnace Co., Elyria, Ohio
Henry Furnace & Fdy. Co., Cleveland, Ohio
Hess-Snyder Co., Massillon, Ohio
Homer Furnace Co., Coldwater, Mich.
Langenberg Mfg. Co., St. Louis, Mo.
Lennox Furnace Co., Marshalltown, Ia.; Syracuse, N. Y.
May-Fiebeger Furnace Co., Newark, Ohio
Meyer Furnace Co., The, Peoria, Ill.
Moncrief Furnace Co., Atlanta, Ga.
Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.
Mueller Furnace Co., L. J., Milwaukee, Wis.
Richardson & Boynton Co., New York, N. Y.
Robinson Co., A. H., Massillon, Ohio
Rybolt Heater Co., Ashland, Ohio
Standard Furnace & Supply Co., Omaha, Neb.
Success Heater Mfg. Co., Des Moines, Iowa
Thatcher Co., Chicago, Ill.
XXth Century Heating & Ventilating Co., Akron, Ohio
Waterman-Waterbury Co., Minneapolis, Minn.
Western Steel Products Co., Duluth, Minn.
Wise Furnace Co., Akron, Ohio

Gas (Acetylene) Dissolved.
Prest-O-Lite Co., Inc., New York, N. Y.

Gas (Nitrogen).
Linde Air Products Co., New York, N. Y.

Gas (Oxygen).
Linde Air Products Co., New York, N. Y.

Glass—Wire.
Lupton's Sons Co., David, Philadelphia, Pa.

Grilles.
Auer Register Co., Cleveland, Ohio
Harrington & King Perforating Co., Chicago, Ill.
Hart & Cooley Co., New Britain, Conn.
Independent Reg. Co., Cleveland, Ohio
Tuttle & Bailey Mfg. Co., Chicago, Ill.

Grilles—Store Front.
Tuttle & Bailey Mfg. Co., Chicago, Ill.

Guards—Machine and Belt.
Harrington & King Perforating Co., Chicago, Ill.

Handles—Boiler.
Berger Bros. Co., Philadelphia, Pa.

Handles—Soldering Iron.
Hyro Mfg. Co., New York, N. Y.

Hangers—Eaves Trough.
Berger Co., L. D., Philadelphia, Pa.
Horan Stay Hanger Co., Louisville, Ky.
Lupton's Sons Co., David, Philadelphia, Pa.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City

Heat Regulation Systems.
National Regulator Co., Chicago, Ill.

Heaters—Cabinet.
Fox Furnace Co., Elyria, Ohio
Mueller Furnace Co., L. J., Milwaukee, Wis.
Waterman-Waterbury Co., Minneapolis, Minn.

Heaters—School Room.
Floral City Heater Co., Monroe, Mich.
Meyer Furnace Co., The, Peoria, Ill.
L. J. Mueller Furnace Co., Milwaukee, Wis.
Standard Furnace & Supply Co., Omaha, Neb.
Waterman-Waterbury Co., Minneapolis, Minn.

Hooks—Conductor.
Berger Co., L. D., Philadelphia, Pa.

Hotels.
Fort Shelby Hotel, Detroit, Mich.

Humidifiers.
Automatic Humidifier Co., Cedar Falls, Iowa
L. J. Mueller Furnace Co., Milwaukee, Wis.

Lath—Expanding Metal.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City

Machines—Crimping.
Bertsch & Co., Cambridge City, Ind.

Machinery—Culvert.
Bertsch & Co., Cambridge City, Ind.

Machines—Tinsmith's.
Bertsch & Co., Cambridge City, Ind.
Burton Co., The W. J., Detroit, Mich.
Dreis & Krump Mfg. Co., Chicago, Ill.
Interstate Machinery Co., Chicago, Ill.
La Salle Machine Works, Chicago, Ill.
Marshalltown Mfg. Co., Marshalltown, Iowa
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Peck, Stow & Wilcox Co., Southington, Conn.
Ryerson & Son, Inc., Jos. T., Chicago, Ill.
Whitney Mfg. Co., W. A., Rockford, Ill.

Mandrels.
Hyro Mfg. Co., New York, N. Y

Metals—Perforated.
Harrington & King Perforating Co., Chicago, Ill.

Miters.
Friedley-Voshardt Co., Chicago, Ill.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City

Miters—Eaves Trough.
Barnes Metal Products Co., Chicago, Ill.
Lupton's Sons Co., David, Philadelphia, Pa.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City

Nails—Hardened Masonry.
Parker-Kalon Corp., New York, N. Y.

Nails—Wire.
American Steel & Wire Co., Chicago, Ill.

Nitrogen (Gas).
Linde Air Products Co., New York, N. Y.

Oil Burners
McIlvaine Burner Corp., Evanston, Ill.

Ornaments—Sheet Metal.
Friedley-Voshardt Co., Chicago, Ill.
Gerock Bros. Mfg. Co., St. Louis, Mo.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City

Oxygen (Gas).
Linde Air Products Co., New York, N. Y.

Paint.
Connors Paint Mfg. Co., Wm., Troy, N. Y.

Patterns—Furnace and Stove.
Cleveland Castings Pattern Co., Cleveland, Ohio
Quincy Pattern Co., Quincy, Ill.
Vedder Pattern Works, Troy, N. Y.

Pipe and Fittings—Furnace.
Burton Co., The W. J., Detroit, Mich.
Henry Furnace & Fdy. Co., Cleveland, Ohio
Lamneck Co., W. E., Columbus, Ohio
Meyer & Bro. Co., F., Peoria, Ill.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
Mueller Furnace Co., L. J., Milwaukee, Wis.
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Standard Furnace & Supply Co., Omaha, Neb.

BUYERS' DIRECTORY

Pipe and Fittings—Stove.
Meyer & Bro. Co., F., Peoria, Ill.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City

Pipe—Conductor.
Barnes Metal Products Co., Chicago, Ill.
Berger Bros. Co., Philadelphia, Pa.
Chicago Metal Mfg. Co., Chicago, Ill.
Dieckmann Co., Ferdinand, Cincinnati, Ohio
Friedley-Voshardt Co., Chicago, Ill.
Lupton's Sons Co., David, Philadelphia, Pa.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
New Jersey Zinc Sales Co., The New York, N. Y.
Wheeling Corrugating Co., Wheeling, W. Va.

Posts—Steel Fence.
American Steel & Wire Co., Chicago, Ill.

Presses.
La Salle Machine Works, Chicago, Ill.

Punches.
Bertsch & Co., Cambridge City, Ind.
Interstate Machinery Co., Chicago, Ill.
La Salle Machine Works, Chicago, Ill.
Peck, Stow & Wilcox Co., Southington, Conn.
Ryerson & Son, Inc., Jos. T., Chicago, Ill.
Whitney Mfg. Co., W. A., Rockford, Ill.

Punches—Combination Bench and Hand.
Hyro Mfg. Co., New York, N. Y.
Ryerson & Son, Inc., Jos. T., Chicago, Ill.
Whitney Mfg. Co., W. A., Rockford, Ill.

Punches—Hand.
Hyro Mfg. Co., New York, N. Y.
Ryerson & Son, Inc., Jos. T., Chicago, Ill.
Whitney Mfg. Co., W. A., Rockford, Ill.

Putty—Stove.
Connors Paint Mfg. Co., Wm., Troy, N. Y.

Radiator Cabinets.
The Hart & Cooley Mfg. Co., New Britain, Conn.
Tuttle & Bailey Mfg. Co., Chicago, Ill.

Radiators—Shields.
Beh & Co., Inc., New York, N. Y.

Ranges—Combination Gas & Coal.
Quick Meal Stove Co., St. Louis, Mo.
Thatcher Co., Newark, N. J.

Ranges—Gas.
Quick Meal Stove Co., St. Louis, Mo.

Register Shields.
Beh & Co., Inc., New York, N. Y.

Registers—Warm Air.
Auer Register Co., Cleveland, Ohio
Forest City-Walworth Run Foundries Co., Cleveland, O.
Hart & Cooley Co., New Britain, Conn.
Henry Furnace & Fdy. Co., Cleveland, Ohio
Lamneck & Co., W. E., Columbus, Ohio
Meyer & Bro. Co., F., Peoria, Ill.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
Mueller Furnace Co., L. J., Milwaukee, Wis.
Stearns Register Co., Detroit, Mich.
Standard Furnace & Supply Co., Omaha, Neb.
Tuttle & Bailey Mfg. Co., Chicago, Ill.

Registers—Wood.
American Wood Register Co., Plymouth, Ind.
Auer Register Co., Cleveland, Ohio
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
L. J. Mueller Furnace Co., Milwaukee, Wis.

Repairs—Stove and Furnace.
Hessler Co., H. E., Syracuse, N. Y.

Ridging.
Armco Distributors Ass'n of America, Middletown, Ohio
Lupton's Sons Co., David, Philadelphia, Pa.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City

Rivets—Stove.
The Kirk-Latty Co., Cleveland, Ohio
Lamson & Sessions Co., Cleveland, Ohio
Ryerson & Son, Inc., Jos. T., Chicago, Ill.

Rods—Stove.
The Kirk-Latty Co., Cleveland, Ohio
Lamson & Sessions Co., Cleveland, Ohio

Rolls—Forming.
Bertsch & Co., Cambridge City, Ind.

Roofing Cement.
Connors Paint Mfg. Co., Wm., Troy, N. Y.
Pecora Paint Co., Philadelphia, Pa.

Roof—Flashing.
Hessler Co., H. E., Syracuse, N. Y.
Milwaukee Corrugating Co., Milwaukee, Wis.

Roofing—Iron and Steel.
Armco Distributors Ass'n of America, Middletown, Ohio
Burton Co., The W. J., Detroit, Mich.
Friedley-Voshardt Co., Chicago, Ill.
Inland Steel Co., Chicago, Ill.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Ryerson & Son, Inc., Jos. T., Chicago, Ill.
Wheeling Corrugating Co., Wheeling, W. Va.

Roofing—Tin.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
Taylor Co., N. & G., Philadelphia, Pa.
Wheeling Corrugating Co., Wheeling, W. Va.

Roofing Tools.
Wm. Biermann, Brooklyn, N. Y.

Roofing—Zinc.
New Jersey Zinc Sales Co., The, New York, N. Y.

Rubbish Burners.
Hart & Cooley Co., New Britain, Conn.

Schools—Sheet Metal Pattern Drafting.
St. Louis Technical Institute, St. Louis, Mo.

Schools—Warm Air Heating.
St. Louis Technical Institute, St. Louis, Mo.

Screws—Hardened Metallic Drive.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
Parker-Kalon Corp., 200 Varick St., New York

Screws—Hardened Self-Tapping, Sheet Metal.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
Parker-Kalon Corp., 200 Varick St., New York

Screens—Perforated Metal.
Harrington & King Perforating Co., Chicago, Ill.

Shears—Hand and Power.
Interstate Machinery Co., Chicago, Ill.
Marshalltown Mfg. Co., Marshalltown, Iowa
Peck, Stow & Wilcox Co., Southington, Conn.
Ryerson & Son, Inc., Jos. T., Chicago, Ill.
Unishear Co., Inc., New York, N. Y.
Viking Shear Co., Erie, Pa.

Sheet Metal Screws—Hardened, Self-Tapping.
Parker-Kalon Corp., 200 Varick St., New York

Sheets—Black and Galvanized.
Armco Distributors Ass'n of America, Middletown, Ohio
Burton Co., The W. J., Detroit, Mich.
Inland Steel Co., Chicago, Ill.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Ryerson & Son, Inc., Jos. T., Chicago, Ill.
Taylor Co., N. & G., Philadelphia, Pa.
Wheeling Corrugating Co., Wheeling, W. Va.

Sheets—Iron.
Armco Distributors Ass'n of America, Middletown, Ohio
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
Ryerson & Son, Inc., Jos. T., Chicago, Ill.

Sheets—Tin.
Taylor Co., N. & G., Philadelphia, Pa.

Sheets—Zinc.
New Jersey Zinc Sales Co., The, New York, N. Y.

Shingles and Tiles—Metal.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
Wheeling Corrugating Co., Wheeling, W. Va.

Sifters—Ash.
Diener Mfg. Co., G. W., Chicago, Ill.

Sky Lights.
Lupton's Sons Co., David, Philadelphia, Pa.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City

Snips.
Peck, Stow & Wilcox Co., Southington, Conn.
Ryerson & Son, Inc., Jos. T., Chicago, Ill.

Solder.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City

Soldering Furnaces.
Burgess Soldering Furnace Co., Columbus, Ohio
Diener Mfg. Co., G. W., Chicago, Ill.
Quick Meal Stove Co., St. Louis, Mo.
Ryerson & Son, Inc., Jos. T., Chicago, Ill.

Specialties—Hardware.
Diener Mfg. Co., G. W., Chicago, Ill.
Hessler Co., H. E., Syracuse, N. Y.
Stars—Hard Iron Cleaning, Fanner Mfg. Co., Cleveland, Ohio

Statuary.
Friedley-Voshardt Co., Chicago, Ill.
Gorock Bros. Mfg. Co., St. Louis, Mo.

Steel Pipe—Welded.
Chicago Metal Mfg. Co., Chicago, Ill.

Stove Pipe Reducers.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City

Stoves—Camp.
Quick Meal Stove Co., St. Louis, Mo.

Stoves—Gasoline and Oil.
Quick Meal Stove Co., St. Louis, Mo.

Stoves and Ranges.
Quick Meal Stove Co., St. Louis, Mo.
Thatcher Co., Newark, N. J.

Tacks, Staples, Spikes.
American Steel & Wire Co., Chicago, Ill.

Tinplate.
Burton Co., The W. J., Detroit, Mich.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Taylor Co., N. & G., Philadelphia, Pa.

Tools—Roofers.
Wm. Biermann, Brooklyn, N. Y.

Tools—Tinsmith's.
Bertsch & Co., Cambridge City, Ind.
Burton Co., The W. J., Detroit, Mich.
Dries & Krump Mfg. Co., Chicago, Ill.
Hyro Mfg. Co., New York, N. Y.
Interstate Machinery Co., Chicago, Ill.
Marshalltown Mfg. Co., Marshalltown, Iowa
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Peck, Stow & Wilcox Co., Southington, Conn.
Ryerson & Son, Inc., Jos. T., Chicago, Ill.
Viking Shear Co., Erie, Pa.
Whitney Mfg. Co., W. A., Rockford, Ill.

Torches.
Burgess Soldering Furnace Co., Columbus, Ohio
Diener Mfg. Co., G. W., Chicago, Ill.
Quick Meal Stove Co., St. Louis, Mo.
Ryerson & Son, Inc., Jos. T., Chicago, Ill.

Trade Extension.
Copper & Brass Research Association, New York, N. Y.
Sheet Steel Trade Extension Committee, Pittsburgh, Pa.

Trimmings—Stove.
Fanner Mfg. Co., Cleveland, Ohio

Ventilators.
Aeolus Dickinson Co., Chicago, Ill.
Akrat Ventilators, Inc., Chicago, Ill.
Arex Company, Chicago, Ill.
Berger Bros. Co., Philadelphia, Pa.
Friedley-Voshardt Co., Chicago, Ill.
Kernchen Co., Chicago, Ill.
Lupton's Sons Co., David, Philadelphia, Pa.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
Standard Ventilator Co., Lewisburg, Pa.

Ventilators—Ceiling.
Hart & Cooley Co., New Britain, Conn.
Henry Furnace & Fdy. Co., Cleveland, Ohio
Tuttle & Bailey Mfg. Co., New York

Windows—Steel.
Lupton's Sons Co., David, Philadelphia, Pa.

Wire—Electrical.
American Steel & Wire Co., Chicago, Ill.

Wire Hoops.
American Steel & Wire Co., Chicago, Ill.

Wire Rope.
American Steel & Wire Co., Chicago, Ill.

Zinc.
New Jersey Zinc Co., The, New York, N. Y.

WANTS AND SALES

Yearly subscribers to the AMERICAN ARTISAN may insert advertisements of not more than fifty words in our Want and Sales Columns WITHOUT CHARGE.

Such advertisements, however, must be limited to help or situation wanted, tools or equipment for sale, to exchange or to buy, business for sale or location desired and must reach our office by Thursday of the week of publication. This privilege is not extended to manufacturers or jobbers—or those making a business of buying and selling used machines, employment agencies and brokers.

When sending advertisement state whether your name or blind number is to be used.

BUSINESS CHANCES

Lightning Rods—Dealers who are selling Lightning Protection will make money by writing to us for our latest Factory to Dealer Prices. We employ no salesmen and save you all overhead charges. Our Pure Copper Cable and Fixtures are endorsed by the National Board of Fire Underwriters and hundreds of dealers. Write today for samples and prices. L. K. Diddle Company, Marshfield, Wis.

For Sale—Furnace business, located in Kansas City, Mo., doing $55,000 to $62,000 per year. Fine building, built for the business—splendid power and hand operated equipment. Stock and equity in building about $18,000. Owner in poor health and wants to retire. A splendid opportunity for young man to make big money. Will consider clear improved city property or clear farm. One of the best paying propositions in this city. Address Y-477, AMERICAN ARTISAN, 620 S. Michigan Ave., Chicago, Ill.

On account of health I will sell my entire business of plumbing, heating, roofing, together with shop, house, barn and two green houses. All improvements. Well located in manufacturing center and four miles from large city in central New York. Address T-477, AMERICAN ARTISAN, 620 S. Michigan Ave., Chicago, Ill.

For Sale—Plumbing and sheet metal business. Good furnace trade, in County seat. 8 ft. cornice brake, 30-in. square shear, 30-in. bar folder, and complete set of crimpers swagers, etc. Plumbers tools to handle up to 4-in. pipe. Good general stock, price $850. Address W-477, AMERICAN ARTISAN, 620 S. Michigan Ave., Chicago, Ill.

For Sale or will trade for property and some cash, well established plumbing and warm air heating business in southwestern Iowa, city of 80,000. A live wire can make some money. Address X-477, AMERICAN ARTISAN, 620 S. Michigan Ave., Chicago.

For Sale—The best hardware stock in Logan County, Illinois. Good clean stock and can be bought right for cash. Address Fred Reinhardt, Box 97, Lincoln, Ill. R-478

For Sale—Tin shop with small stock of shelf hardware in connection. Will sell either or both with buildings. Address A. D. Barton, Mackinaw, Ill. P-478

BUSINESS CHANCES

For Sale—Combined hardware store and sheet metal shop located in north central Illinois. Plenty of work. Will sell hardware or sheet metal separately. Double building; will either sell or give long lease. Selling on account of other interests taking up my time. Fine opportunity for somebody. Address G-478, AMERICAN ARTISAN, 620 S. Michigan Avenue, Chicago, Illinois.

For Sale—Well established furnace, sheet metal and roofing business in fast growing Chicago suburb, or will consider partner. Do not waste your time unless you have $2,000 or more. Address H. R. Harrison, 4537 N. Paulina Street, Chicago, Illinois. Sunnyside 7302. H-478

Plumbing and heating business. Located Michigan, city of 62,000. Business clears $5,000 year. 7 room modern residence, building 18x40, equipment and stock complete, $16,000 deal. Two-third cash. Mielke Bros., Danville, Ill. Z-477

SITUATION WANTED

Sheet metal worker and repair man for such as plumbing, steam fitting and boiler repairs with 15 years of experience wants steady position. Capable and steady. Address H475, AMERICAN ARTISAN, 620 S. Michigan Avenue, Chicago, Ill.

Situation wanted by plumber, furnace man and tinner. Can install hot water, steam or vapor. Married and 15 years' experience. Please state particulars in first letter. Address J-478, AMERICAN ARTISAN, 620 S. Michigan Avenue, Chicago, Illinois.

Furnace salesman with 20 years' experience in furnace lines, past five years traveling in Wisconsin for furnace manufacturer, wishes position with progressive furnace manufacturer. Address K-478, AMERICAN ARTISAN, 620 S. Michigan Avenue, Chicago, Illinois.

Situation wanted by first class metal worker and furnace setter. Also A-1 pattern cutter. Can handle men and run shop. Would like to hear from some good reliable firm in need of such a mechanic. Address Bert J. Hawkins, 1000 N. Water St., Owosso, Mich. K-477

Situation wanted by a first class sheet metal worker and tinner. Warm air furnace work and plumbing. Address L-477, AMERICAN ARTISAN, 620 S. Michigan Ave., Chicago, Ill.

Good sheet metal, plumber and heating man open for a good job. 17 years' experience. Can go to work at once. Address S-478, AMERICAN ARTISAN, 620 S. Michigan Ave., Chicago, Ill.

Position wanted by good steady reliable tinner on gutters and furnaces. Chicago or nearby town. Willing worker with good references. Telephone Mansfield 9132 or address M-477, AMERICAN ARTISAN, 620 S. Michigan Ave., Chicago.

Expert furnace installer and all around sheet metal worker wishes steady position. Married, steady and of good habits. Have had 30 years' experience. Can come at once. Address A. J. Baysinger, Lodi, Wis. O-477

Wanted — By tinsmith, hardwareman, bandman, job in store or shop. Kansas or Oklahoma. Address J-477, AMERICAN ARTISAN, 620 S. Michigan Ave., Chicago, Ill.

HELP WANTED

Wanted—First-class sheet metal worker who can take set of plans and lay out the job as well as install it on heating and ventilation and general sheet metal work. Union shop. $1.25 per hour. Address West Side Sheet Metal Works, 1011 Washburn Ave., Scranton, Pa. X-478

Man wanted for general sheet metal and furnace work in country town shop. Sober and reliable. State wages and experience in first letter. Prefer man from within 50-75 miles radius who can come at once. Address Buehrens Tin Shop, Dorchester, Wisconsin. D-478

Wanted — Tinner and furnace man. Must be able to lay out patterns and take charge of work in shop. Scandinavian preferred. No boozer need apply. Will consider selling one-half interest to right party. Geo. B. Cummings, 710 4th Ave., S. E., Minot, N. D. Y-478

Wanted — First-class mechanic for square duct installation. Must be a good layout man and be able to make up complete job in shop. Address W. H. Kratzer Co., 5227 Grand River Ave., Detroit, Mich. Z-478

Wanted—A tinner who also has experience in built up asphalt and gravel roofs. Steady employment for a good reliable mechanic. State experience and wages expected. Address Enberg's Sheet Metal Works, Kearney, Nebr. P-477

TINNERS' TOOLS

For Sale.—One 30-inch P. S. & W. Gutter Beader No. 701. New-Price $8.00. One 20-inch P. S. & W. Groover for 2 inch work or larger. Good as new—price $15.00. Address Lock Box 38, Fredonia, Pennsylvania. E-478

Wanted — Used tools — 8 ft. cornice brake, crimper, barring machine, 30-in. rolls, bar fold, mandrel, square head, beak and blow horn. Address Garthwaite Bros., Mt. Hope, Wis. R-477

For Sale—Second-hand 31-inch by 2-inch rolls in good condition. A $12.00 check will take same. Address Jack Laurie, Churubusco, Ind. T-478

Wanted — Used adjustable pipe stock and dies. Capacity 2½ to 4". State make and condition, also price. Address J. H. Bedford, Bridgeport, Ill. W-478

MISCELLANEOUS

Warm air heating engineer, 30 years' practice, has designed a new warm air furnace with 15,000 square inches of prime heating surface, for oil burners only. Good manufacturing proposition and the only practical furnace ever made for burning oil economically. Want to connect with live wire manufacturer that wants something better. Address C. M. Buller, 2116 Fond du Lac Ave., Milwaukee, Wis. L-478

Anyone knowing the present address of George Corblis, tinner, formerly of Columbus, Ohio, kindly address C. M. Buller, 2116 Fond du Lac Ave., Milwaukee, Wis. M-478

BOOKS

Manual of Automotive Radiator Construction and Repair, by F. L. Curfman and T. H. Leet—Anyone interested in Radiator Repairing will find the 185 pages of practical instructions and the 120 illustrations showing actual construction and repairing a big help. In a condensed manner some four to five thousand answers to questions are given. It is thoroughly practical as both authors are men of wide experience in this work. Printed in large, easy to read type. Measures 5¾x9 inches. Price $2.50. Order from Book Dept., AMERICAN ARTISAN, 620 South Michigan Avenue, Chicago, Illinois.

The problem of keeping an accurate set of books is one which gives many sheet metal contractors a lot of trouble. A new and very simple system called the National Faultless System makes it possible for you to be your own bookkeeper. It is really four books in one. It contains records for four years and ALL transactions and records for one month are recorded on ONE PAGE. This system eliminates cash book, day book and journal, but qualifies every transaction of a full month's business on one sheet. Many other features. Write, for full details, Book Dept., AMERICAN ARTISAN, 620 South Michigan Ave., Chicago.

SPECIAL NOTICES

The Rate for Special Notices — displayed want ads — $3.00 per inch per insertion

When sending copy state whether your name or blind number is to be used—also how many insertions are desired.

SITUATION WANTED

Heating, ventilating, furnace work, sheet metal estimator and superintendent of construction on any of the above. Am a real hustler and business getter, can do my own laying out. Willing to start a heating and ventilating dept. with a real roofing concern doing large volume of business. Will work on salary and commission or straight salary. Anywhere in U. S. Address A-478, AMERICAN ARTISAN, 620 S. Michigan Ave., Chicago.

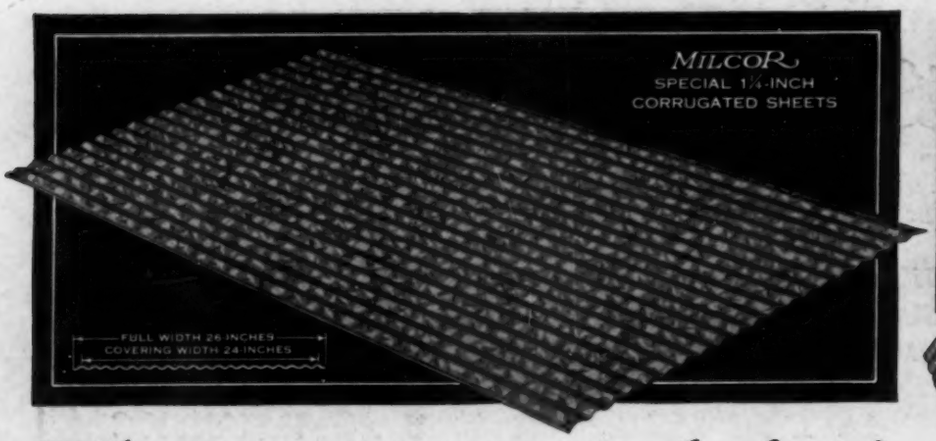
WANTED

Salesman for Northern Illinois and Southern Wisconsin, to sell our line of Sheet Metal supplies, Eave Trough, Conductor Pipe, Stove Pipe, etc. Prefer one established in that territory. Address O478, American Artisan, 620 So. Michigan Ave., Chicago, Ill.

SALESMEN WANTED

Three capable salesmen wanted immediately for middle western territory. In making application be sure to give furnace experience with total volume of sales each year for the past three years. Do not apply unless you have a record which proves your ability. We want three real salesmen who will be a credit to the Waterbury organization. The Waterman-Waterbury Company, 1121 Jackson St., N. E., Minneapolis, Minn. F478

The Ventilation Handbook, by Charles L. Hubbard. A practical book designed to cover the principles and practice of ventilation as applied to furnace heating, ducts, flues and dampers for gravity heating; fans and fan works for ventilation and hot blast heating by means of a comprehensive series of questions, answers and very plain descriptions easy to understand. Price $2.00. Order from Book Dept., AMERICAN ARTISAN, 620 South Michigan Avenue, Chicago, Illinois.

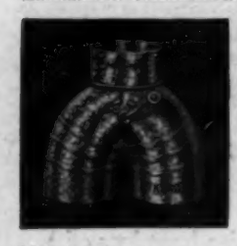


What you want—*and when!*

YOU will find it in the Milcor Net Price Book. Carry it on your hip. Thousands of sheet metal men do. It's a business-like habit. For Milcor has *what* you want....ready *when* you want it!

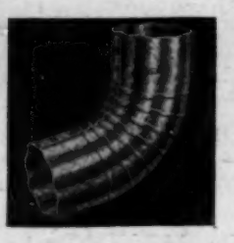
Your Trade appreciates Milcor quality and service, too! Same-day deliveries direct from our Milwaukee, Chicago, Kansas City or La Crosse plants....or from leading jobbers.

For over 20 years, these famous "Kuehn's Korrekt Kutoffs" (Pat'd.) have been made by Milcor. And they are still the best cutoffs made.



The famous Milcor "Crimpedge Gutter" — the most popular single-bead eaves trough ever made. Millions of feet of it in service. Standardize on it.

Milcor One-piece flat-crimp conductor pipe Elbows, round or square, are designed to withstand severe service. Dependable, uniform quality.



Milcor products are now made not only in Steel, but also in "Coppered Metal", Wilder Metal, pure Zinc, pure Anaconda Copper, or in the famous rust-resisting Armco Ingot Iron. Look for this mark:

ARMCO
Ingot Iron

Style box-gutters, conductor pipe, heads and bands, architectural sheet metal, marquees, metal ceilings, ventilators, skylights, metal lath and allied products are included in the complete Milcor Line.

MILWAUKEE CORRUGATING COMPANY

MILWAUKEE, WIS. CHICAGO, ILL. KANSAS CITY, MO. LA CROSSE, WIS.

MILCOR

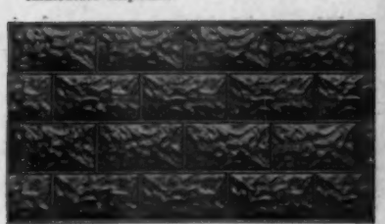
SHEET METAL PRODUCTS

Manufacturing Furnace Pipe and Fittings, Stove Pipe and Elbows, and warm air heating equipment is an important part of Milcor activities.

Kuehn's Ridge Sheets—combining ridge-roll and corrugated sheet in one unit. Eliminates separate ridge roll. Saves labor. Insures storm-proof ridge. See Page 64 of Price Book — or write for FREE copy of book.

Milcor Galv. or Painted Pressed Standing Seam Roofing. Three styles: Regular, Beaded, and Noiseless.

Milcor Roll Roofing, Black or Galv. Flat Sheets, Terne Plates, Stove Pipe Iron, Sheet Copper, Sheet Zinc—always in stock, for immediate shipment.



Milcor "Rock Face Stone" Metal Siding, Galv. or Painted.

Milcor "Weatherboard" Metal Siding, Galv. or Painted. See Page 77 in Net Price Book.